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HEALTH SYSTEMS DIVISION NOTE
HSDN 77-2

MEASURES AND INDICATORS FOR EVALUATION OF INNOVATIONS
TO
THE HEALTH CARE SYSTEM

June 1977

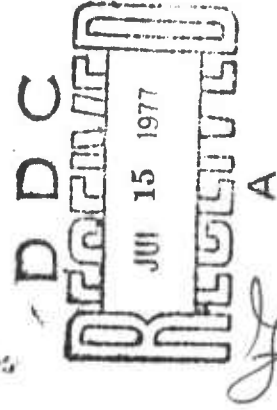
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Preface

The assignment that led to this document was to prepare a report on "high level performance" measures and indicators for evaluating achievement of TRIMIS program objectives for improving the effectiveness and economy of the Military Health Care System (MHCS). In this context, "high level performance" measures and indicators are those concerned with the fundamental objectives of the MHCS--the reasons for its existence. The report does not present or discuss the many other potential measures and indicators that are concerned with intermediate goals of the health care system and that would be candidates for inclusion in a comprehensive evaluation of an innovation to the system. The report presents a broad spectrum of "high level performance" measures and indicators that have been proposed and in some cases applied to evaluate health care system effectiveness. The assignment concerned the military health care system, but many, if not most, of the measures and indicators are equally applicable to any health care system. To make the report more generally useful, some measures and indicators are included that have limited applicability for the MHCS.

The report is intended to be descriptive rather than prescriptive. It is not an exhaustive presentation of the possible measures and indicators but seeks to provide a fairly representative set. From this report an evaluator may select measures and indicators that are most useful and feasible for his purpose. In no case would he use all of them. Normally, however, he will have to establish some additional ad hoc measures to meet his particular needs. Inclusion of a measure or indicator is not a recommendation that it be used. Many of those listed, particularly the indicators, have not been validated, and many applications are currently infeasible.

The categories and subareas in which the measures and indicators are presented have been defined to organize the discussion. Distinctions between them are not rigid, and the classification of a measure or indicator does not limit its use to that area. In some cases the classification was made somewhat arbitrarily to avoid establishing an unwieldy number of classes. In addition, some measures and indicators are stated generally to avoid presenting numerous similar ones. Terms such as "appropriate outpatient visit" and "operational capacity" must be specifically defined for each application.

ABBREVIATIONS

MHCS - Military Health Care System

CHAMPUS - Civilian Health and Medical Program of the
Uniformed Services

MTF - Medical Treatment Facilities

DOD - Department of Defense

NTIS - National Technical Information Service

MEDIHC - Medical Experience Directed Into Health Care

FTE - Full Time Equivalent

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1. INTRODUCTION

INTRODUCTION

PURPOSE

- PROVIDE OVERVIEW OF MEASURES AND INDICATORS
 - TO EVALUATE THE IMPACT OF:
 - INNOVATIONS TO THE HEALTH CARE SYSTEM
 - . ON THOSE AREAS OF SYSTEM EFFECTIVENESS THAT BEAR ON THE BASIC REASON FOR ITS EXISTENCE
 - THE TRIMIS PROGRAM
 - . ON THE MILITARY HEALTH CARE SYSTEM

The purpose of this report is to provide an overview of measures and indicators that might be used to evaluate the impact of innovations to the health care system in terms of the basic reasons for its existence. The immediate intended use is to aid in selection of measures and indicators for evaluating the impact of the TRIMIS program on the Military Health Care System

ENVIRONMENT

- DELIBERATE, SYSTEMATIC EVALUATION IS RELATIVELY NEW
- STATE OF THE ART IS PRIMITIVE
- MEASURES AND INDICATORS ARE NOT WELL DEFINED
- THERE IS LITTLE CONSENSUS ON WHICH ARE BEST
- THERE ARE FEW VALIDATED INDICATORS
- DEFINITION OF HEALTH ITSELF IS CONTROVERSIAL
- GOALS AND CRITERIA FOR HEALTH CARE SYSTEM ARE NOT WELL DEFINED
- BOUNDARIES OF HEALTH CARE SYSTEM ARE UNCERTAIN
- HEALTH CARE SYSTEM IS INHERENTLY INSEPARABLE FROM THE BROADER SOCIAL SYSTEM IN WHICH IT EXISTS
- EVALUATION OF A SYSTEM INNOVATION IS SOMEWHAT EASIER THAN EVALUATION OF THE SYSTEM PER SE
- DATA BASE IS FRAGMENTARY
- DATA COLLECTION IS COSTLY

To set the subject in perspective, consideration of the environment in which we undertook the study is appropriate.

Interest in systematic evaluation of the health care system and of innovations to it is relatively new. Partly as a consequence of this, the state of the art of evaluation is in a very early stage of development. Measures and indicators frequently are not well defined, and there is little consensus on which are best. This is easy to understand since only a limited effort has thus far gone into validation of indicators, and that effort has had very limited success. Perhaps an even more fundamental difficulty is that the definition of health continues to be controversial. Without such a definition it is difficult to proceed with confidence in establishing well defined goals and criteria for the health care system, and the boundaries of the system for the purposes of evaluation are also a matter of controversy; should, for example, the system be defined as including the economic interest of the patient, or only the economic interest of the organization that provides care? Since it is not possible to separate fully the health care system from the larger social system in which it exists, answers to such questions will always be arbitrary and will thus complicate the tasks of evaluators and decisionmakers. All of these complications are heightened by the fragmentary nature of the existing data base and the resulting barriers to attempts through analysis to better understand the system and the possibilities for meaningful evaluation. Correction of the data base deficiencies is inhibited by the costliness of data collection, particularly in the manual mode.

The kind of evaluation we are concerned with is relatively undeveloped. We have identified, based on what is known and has been done, measures and indicators that might be used to evaluate innovations to the health care system. Fortunately, evaluation of the impact of innovations on system effectiveness and economy is in some ways significantly easier than evaluation of the absolute effectiveness and economy of the system. It is easier because to evaluate the impact of the innovation we need only changes in system effectiveness. On the other hand, a considerable period of time is frequently required to detect and verify a change and it is difficult to clearly establish the role of the innovation in causing the change.

APPROACH TO STUDY

- IDENTIFICATION AND DEFINITION OF AREAS OF HEALTH CARE SYSTEM EFFECTIVENESS AND ECONOMY
- RELEVANCE OF AREAS TO MHCS OBJECTIVES
- ALTERNATIVE MEASURES OR INDICATORS FOR EACH AREA
 - RELEVANCE TO HEALTH CARE INFORMATION SYSTEMS GENERALLY
 - METHOD OF EVALUATION
 - CURRENT AND PRIOR APPLICATIONS
 - . TO EVALUATE HCIS
 - . OTHER
 - FEASIBILITY OF DATA COLLECTION
 - ADVANTAGES AND LIMITATIONS OF MEASURE
 - OVERALL FEASIBILITY OF USING
- OVERALL FEASIBILITY OF EVALUATING IMPACTS ON EACH AREA

Our approach to identifying measures and indicators to evaluate the impact of innovations generally, and of health care information systems specifically, on the fundamental effectiveness and economy of the health care system, entails several distinct steps. Accomplishment of the tasks is an interactive process in which results of later steps lead to changes in the earlier steps.

The first step is to identify and define the potential areas of health care system effectiveness and economy. The second step is to determine the relevance of each area to the objectives of the military health care system. The third step is to search in the literature, with the notable workers in the field, and in our own experience, knowledge, and reason for the measures and indicators that are candidates for use in each area. The fourth step is to identify the fundamental alternative ways in which each measure might be applied in an evaluation. One way, for example, is to conduct a controlled trial in which study and control samples are selected randomly from the population. The fifth step, ideally, is to identify, for each combination of a measure and a method of evaluation, the following:

- o Current and prior applications to evaluate either health care information systems or other innovations
- o Feasibility (including limitations, required effort, and cost) of alternative ways of collecting the necessary data
- o Advantages, disadvantages, and limitations of the measure.

The sixth step is to assess, in light of the results of step five, the overall feasibility of using the measure. The seventh and last step is to appraise, in view of the results of step six, the feasibility of evaluating impacts on the area of effectiveness or economy.

During the study thus far we have accomplished, in varying degrees of completeness, steps five through seven. The task could be rigorously completed only with much greater effort than that devoted to it so far. While work is continuing the value of rigorously completing the task, in view of the present state of the art of the subject, may not justify the manpower it would entail.

APPLICABILITY OF MEASURES AND INDICATORS

- TO MILITARY HEALTH CARE SYSTEM
 - DIRECT
 - CHAMPUS
- TO CIVILIAN HEALTH CARE SYSTEMS
- FOR A VARIETY OF HEALTH CARE SYSTEM EFFECTIVENESS STUDIES
- FOR COMPARING SYSTEMS OR FACILITIES—DOUBTFUL

Most of the measures and indicators discussed in this report are applicable for studying effectiveness in both the military and civilian health care sectors. Within the Military Health Care System, they may be used to study both the direct care and Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) components. There are, of course, some that are not generally applicable such as some measures and indicators of retention, recruitment, and training that are specific to military personnel; and some terms such as "personnel categories" will have different meanings for applications in the different sectors. Further, each sector entails its own set of limitations or special considerations in applying a given measure or indicator.

Applicability of the measures and indicators also extends in general to all kinds of health care system effectiveness studies. For example, they could be used to evaluate system innovations, to identify deficiencies, or to monitor costs. As in the case of applications in different sectors, each different kind of study introduces its own set of limitations to the use of a measure or indicator.

This report addresses use of these measures and indicators to evaluate innovations to health care systems and in particular to the direct care component of the MHCS. It does not give specific consideration to the feasibility of other uses. One other use that warrants specific comment here is their use in comparing systems or facilities with one another. This can only be done with extreme caution, and even then the value of the results may be doubtful. For example, to compare the average length-of-stay in military facilities with that reported for CHAMPUS patients, it would be necessary to identify and account for all the factors that affect length-of-stay differently in these situations. It is usually quite difficult to determine the extent of the difference in the effects of such factors.

AREAS OF EFFECTIVENESS AND ECONOMY OF THE MILITARY HEALTH CARE SYSTEM (MHCS)

● EFFECTIVENESS

- QUALITY OF HEALTH CARE
- AVAILABILITY OF HEALTH CARE
- ACCESSIBILITY OF HEALTH CARE
- ACCEPTABILITY OF HEALTH CARE
- APPROPRIATENESS OF UTILIZATION OF HEALTH CARE
- RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE PERSONNEL
- ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL
- PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL
- RESPONSE TO CHANGING NEEDS
- ORGANIZATIONAL IMAGE
- CONTRIBUTIONS TO SOCIETY

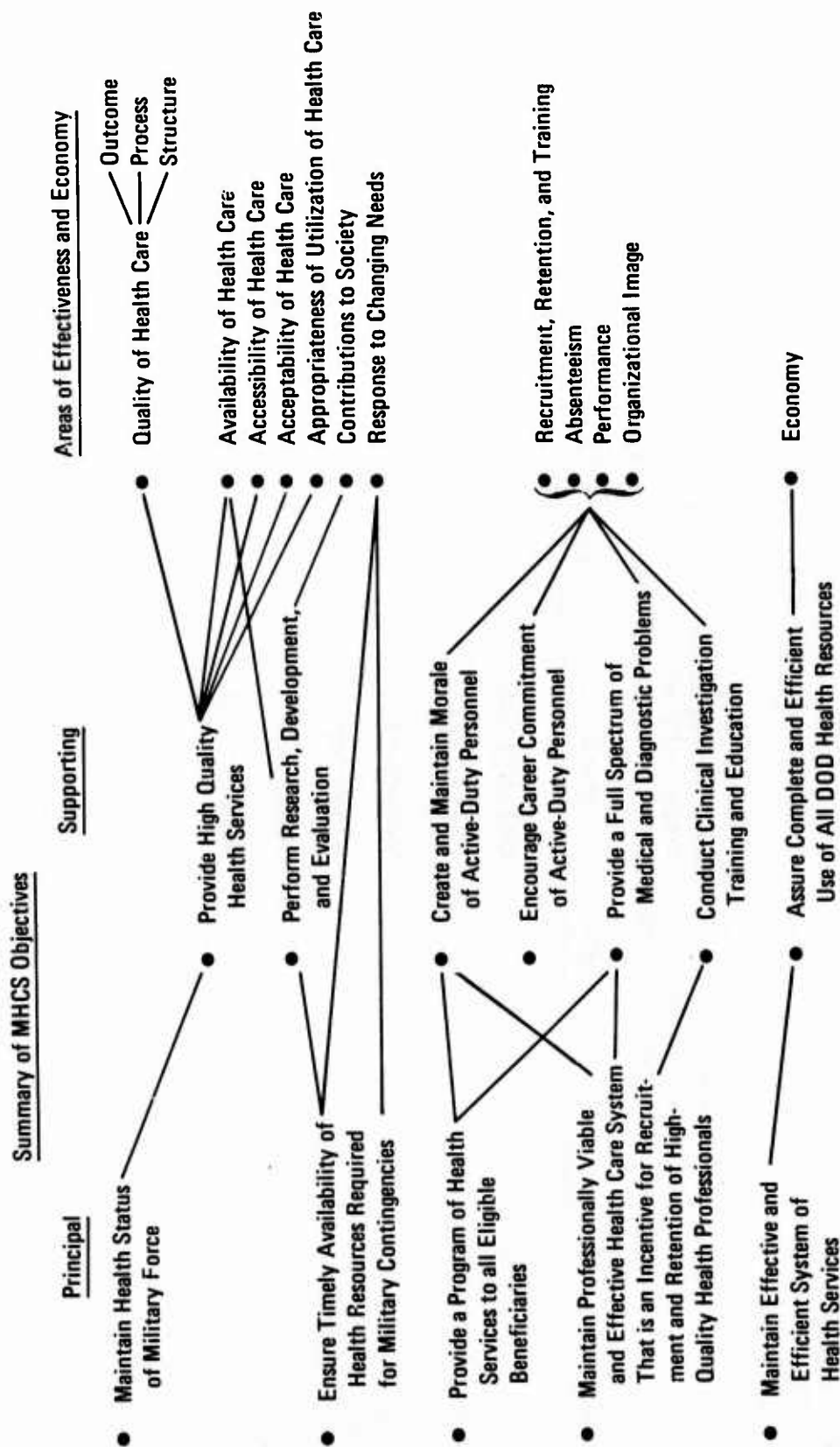
● ECONOMY

The chart lists the eleven areas of effectiveness of the health care system and economy. Because of the nature of the three areas concerned with personnel, they are specified in terms of the Military Health Care System (MHCS).

Each of these, in turn, is developed in the following pages. The subjects covered for each are:

- o Definition
- o Rationale
- o Subareas
- o Measures and Indicators
- o Overview
- o References

RELEVANCE OF AREAS OF EFFECTIVENESS AND ECONOMY TO MILITARY HEALTH CARE SYSTEM (MHCS) OBJECTIVES*



*Lines on this diagram indicate only a few of the possible relationships. In particular, each supporting objective can contribute to all of the principal ones.

This chart summarizes the principal and supporting objectives of the MHCS as they are outlined in the Report of the Military Health Care Study.* It also lists the areas of effectiveness and economy that are discussed in this report and indicates some important relationships between them and the MHCS objectives.

* The Department of Defense; the Department of Health, Education, and Welfare; and the Office of Management and Budget. Report of the Military Health Care Study, Supplement: Detailed Findings, December 1975.

BASIC ALTERNATIVE KINDS OF EVALUATION

- PREDICTIVE EVALUATION
 - JUDGMENT OF EXPERTS
 - LOGICAL AND MATHEMATICAL ANALYSIS BASED ON
 - JUDGMENT OF EXPERTS
 - DATA
 - COMBINATION OF JUDGMENT AND DATA
- DIRECT EVALUATION
 - JUDGMENT OF EXPERTS
 - SYSTEMATIC OBSERVATION AND ANALYSIS
 - PARALLEL
 - MATCHED SITUATIONS (CONTROLLED TRIAL)
 - SIMILAR SITUATIONS (COMPARISON)
 - LONGITUDINAL
 - BEFORE AND AFTER
 - TIME SERIES

This chart outlines some basic alternatives for accomplishing predictive and direct evaluations of changes in a measure produced by an innovation to the health care system.

An evaluation of the expected change in a measure, a predictive evaluation, might be based entirely on the judgment of those most knowledgeable about the innovation and the health care system. Alternatively, we might perform a careful analysis of the existing system and the proposed innovation. Such an evaluation could rely on expert judgment, hard data or a combination of judgment and data.

The alternatives for direct evaluation are somewhat similar. In this case the evaluation could be based on expert estimation of the change observed when an innovation is actually introduced, or the change can be systematically observed, measured and analyzed. Parallel observations could be made of carefully matched and controlled situations with the innovation introduced in one but not the other. This constitutes a controlled trial, which is probably the best though most difficult and expensive approach. Usually it would only be feasible to observe in parallel two similar situations, one with and the other without the innovation. Longitudinal studies are an alternative to parallel studies. These may involve observations made once just before the innovation is introduced and again after it has been implemented and is operating smoothly. Alternatively, observations could be made a number of times before and after implementation. Such time series data permit identification of trends in changes that are occurring.

2. QUALITY OF HEALTH CARE

QUALITY OF HEALTH CARE

QUALITY OF HEALTH CARE

DEFINITION

THE DEGREE TO WHICH HEALTH CARE PROVIDED BY
A HEALTH CARE SYSTEM OR A SPECIFIED COMPONENT
OF THAT SYSTEM MEETS THE STANDARDS OR NORMS
IMPLICIT IN THE SYSTEM OR EXPLICITLY
ESTABLISHED FOR IT

Webster's New World Dictionary defines quality as the degree of excellence that a thing possesses. This is not, however, a particularly useful definition but simply a substitute of another word having the same meaning. The word "goodness" could also be used. Quality, excellence, and goodness all imply the existence of a standard or norm (or set of standards or norms), subjective or objective. The degree of excellence is then either a judgment or an objective measure of the extent to which the thing achieves the standard or norm. Thus, the quality of health care is the degree to which health care achieves certain standards or norms, and evaluation of health care quality requires either the identification of appropriate standards and norms that already exist, or the establishment of such standards and norms.

QUALITY OF HEALTH CARE

RATIONALE

- VALUE OF PROVIDING
- NATIONAL EMPHASIS
- MAJOR OBJECTIVE OF MILITARY HEALTH CARE SYSTEM

Health care is a service. The quality of a service is closely associated with its value. If, for example, the quality of the service is very low, the value of providing it may be negligible or even negative—it may even be better not to provide it at all. Whether a high correlation exists between quality and value of health services depends on how closely the norms and standards for quality reflect the purpose of and value of providing health care.

The pronounced nationwide increase of health care costs during the past two decades has led to national concern over the worth of health care as it is now provided and the establishment of legislation (P.L. 92-603, 1972) emphasizing the need to ensure the quality of care (referred to as quality and assurance). This legislation implies that quality and value of care are directly related since it requires health care providers, as a condition for reimbursement under national programs such as Medicare and Medicaid, to establish programs to assure the quality of care.

The objectives of the Military Health Care System (MHCS) emphasize the importance of providing high quality care to active-duty personnel, retirees, and dependents.

QUALITY OF HEALTH CARE

APPROACHES TO EVALUATION

- OUTCOMES
- PROCESS
- STRUCTURE

Three approaches to evaluation of health care quality were first delineated by Avedis Donabedian. These approaches select different aspects of the health care system as reflecting care quality: outcome, process, and structure. The outcome approach considers the result of a patient's experience with the system—his condition after an episode of illness or when a stable condition is reached. The process approach evaluates the process of care itself—what the health care system does for a patient during an episode of illness. Finally, the structure approach considers health care resources and their characteristics; for example, numbers and categories of medical personnel, physician training, hospital accreditation, medical staff organization, kinds of equipment, and the condition of physical facilities. While a single one of these approaches might be used for a specific purpose (for example, use of process criteria for peer review), all three would have to be considered in any realistic attempt to do a comprehensive evaluation of the overall quality of care provided by a complex health care system. Finally, it should be realized that these are only approaches intended to facilitate studies. There will be measures and indicators of care quality that do not fit clearly and unequivocally under a single one, if any of them. When this occurs we must make a somewhat arbitrary decision to discuss the measure or indicator under one or the other of these approaches.

3. QUALITY-OUTCOMES

QUALITY OF HEALTH CARE EVALUATED IN TERMS
OF OUTCOMES

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES

DEFINITION

THE EXTENT TO WHICH THE COURSE OF A PATIENT'S
HEALTH AND ACTIVITY STATUS, FOLLOWING START OF
HEALTH CARE, MEETS OR EXCEEDS THE EXPECTATIONS
OF THE HEALTH CARE COMMUNITY

The quality of health care evaluated in terms of outcomes is the extent to which the course of a patient's health and activity status, following start of health care, meets or exceeds the expectations of the health care community.

Outcome criteria for evaluating health care are usually not well defined. Standards for judging quality originate with the expectations of the health care community. This broad group includes individuals and organizations having expectations related to quality because they provide care, influence the availability of care resources, or depend on the health care system for services. For most patients and conditions, there are some general ideas about how the particular condition will usually develop under various circumstances. These lead to opinions about what outcomes should result from good care, what outcomes would be unacceptable, and which would be "surprisingly good." For populations, there are corresponding expectations about the occurrence and severity of disease and impairment, and about mortality rates. Not all expectations related to quality are appropriate as standards for evaluation. It is necessary to refine expectations to produce acceptable evaluation standards.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES

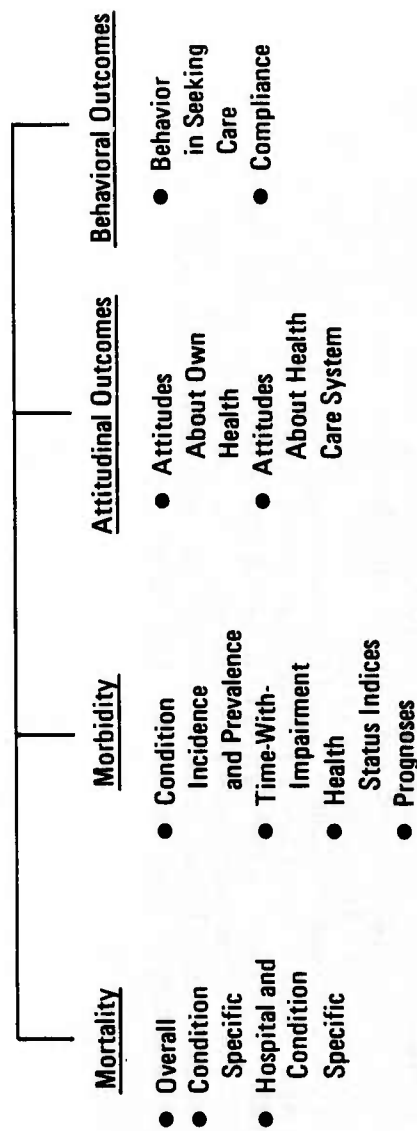
RATIONALE

- EVALUATING OUTCOMES IS THE ONLY APPROACH THAT DIRECTLY MEASURES HOW WELL THE HEALTH CARE SYSTEM ACHIEVES ITS ULTIMATE GOAL

- RELATION TO OUTCOMES IS THE BASIS FOR OTHER APPROACHES TO EVALUATION

Since the ultimate purpose of the health care system is to maintain or improve health, evaluating quality in terms of outcomes is the only approach that directly measures how well the health care system is accomplishing its mission. The other approaches to evaluation of care quality—structure and process—are based on the assumption that good structure and the correct process will lead to optimal outcomes. If outcome measures could always be effectively and easily applied, there would be no need for process or structural measures of quality.

MAJOR KINDS OF OUTCOMES AND THEIR MEASURES AND INDICATORS
FOR QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES



This chart identifies four kinds of health care outcomes and the main kinds of measures and indicators of each of them. No one kind of outcome, by itself, adequately describes the results of health care. Together, they provide a fairly comprehensive assessment of the health of a population or of particular subpopulations.

The first outcome category is mortality. This rather crude measure is probably the oldest outcome measure on which data have been collected. With the conquest of infectious diseases that had high mortality rates, interest has shifted to describing outcomes in terms of the disease-produced impairments in the population--morbidity measures. In recent years, there has been growing concern with how people feel about the health care system and their own health. To the extent that these attitudes are influenced by health care, they form another category of outcomes. The final category is behavioral outcomes. Some measures and indicators we list in this category (e.g., patient compliance) do not fit in any of the approaches for evaluating care quality as defined herein. These measures and indicators involve an important aspect of the quality of health care. We have included them in the outcome section since such patient behavior may be affected by the care rendered. The patient's behavior is also a determinant of his health status, so these measures and indicators could just as well have been treated in the section on the care process.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES: MORTALITY

MEASURES AND INDICATORS

- AGE ADJUSTED DEATH RATE, OVERALL 42,18
- CONDITION SPECIFIC AGE ADJUSTED DEATH RATE 15,39
- HOSPITAL DEATH RATE FROM SPECIFIC CONDITIONS 7,30

Mortality measures are usually age adjusted. That is, observed death rates for different age groups are weighted in proportion to the fraction of some standard population that falls into each age group. The results for all age groups are added to give a death rate that is uninfluenced by the age distribution of the population in which the deaths were observed. These age adjusted death rates may be based on all deaths or on deaths from a specific disease or condition.

In a specific institution, the rate of mortality among all admissions might be considered for use in evaluating quality. However, it is clear that this measure is extremely sensitive to changes in case mix and severity. Therefore, it is not included in this list. A somewhat better measure for a hospital is the death rate among patients with specific conditions. Even this should be used with extreme care as the severity of the cases of a given disease that an institution admits may differ among institutions and with time. As a result, this measure may only rarely be useful.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES: MORBIDITY

MEASURES AND INDICATORS

- INCIDENCE OF SPECIFIC CONDITIONS 16,27
- PREVALENCE OF SPECIFIC CONDITIONS 23
- PREVALENCE OF CHRONIC CONDITIONS CAUSING ACTIVITY LIMITATIONS 43
- BED DISABILITY DAYS, ACUTE CONDITIONS 43
- RESTRICTED ACTIVITY DAYS, ACUTE CONDITIONS 43
- WORK LOSS DAYS, ACUTE CONDITIONS 43
- BED DISABILITY DAYS, CHRONIC CONDITIONS 43
- RESTRICTED ACTIVITY DAYS, CHRONIC CONDITIONS 43
- WORK LOSS DAYS, CHRONIC CONDITIONS 43
- IMPAIRMENT IN PATIENTS WITH SPECIFIC CONDITIONS 32,21
- HEALTH STATUS INDEX FOR POPULATION 6,25,26,27,41
- - VALUE ADJUSTED EXPECTED YEARS OF LIFE
 - ACTIVITIES OF DAILY LIVING SCORE
- HEALTH STATUS INDEX FOR SPECIFIC CONDITION 6,25,26,27,41
- - VALUE ADJUSTED EXPECTED YEARS OF LIFE
 - ADJUSTED DAILY LIVING SCORE
- CONDITION SPECIFIC PROGNOSSES 20,38,45
- YEARS OF LIFE HEALTHIER THAN A SPECIFIED IMPAIRMENT LEVEL 17

Because the impact of illness, short of death, can take many forms, the measures and indicators of morbidity are more numerous and more complex than those of mortality. The first two are the traditional public health measures—the rate of occurrence of new cases of a disease and the number of cases existing in the population. The third includes all conditions that are persistent and impairing.

The next six measures separate all acute from all chronic conditions and differentiate degrees of impairment in terms of how and for how long they cause routine activities to be altered. Data for these measures are collected routinely by the National Health Survey of the National Center for Health Statistics on a nationwide sample of the population.

Impairment (such as bed-disability days, work-loss days, days detectable or symptomatic, and days capable of self care) for specific conditions can also be used as morbidity measures.

Because impairment can vary both in kind and in severity, several schemes have been proposed for combining different facets of impairment to get a single number which represents an individual's health status. This is a health status index. The values for individuals can be averaged to get an index for a population or for patients with a specific condition. One such index assigns a socially determined value to the impairment conditions expected during the remainder of the patient's life. The value of each time period in the patient's expected life is summed to give a "value-adjusted expected years of life." A simpler measure that doesn't involve time is the index of activities of daily living—a numerical indication of the assistance a patient requires in coping with the tasks of daily living. It also can be applied both to entire populations and to patients with a specific condition.

An examination of the prognosis for specific conditions indicate the morbidity expected from such conditions, and comparisons of observed morbidity with some standard gives an indication of the effectiveness of the health care system. A prognosis is a prediction of impairment over time. For any specific impairment level we have (given the prognosis) an expected number of years of life healthier than this level. These expected years can be averaged for a population to give our last measure, "years of life healthier than a specified impairment level."

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES: ATTITUDINAL
1,23,34,40
MEASURES AND INDICATORS

- SCORE ON SURVEY CONCERNING ANXIETY ABOUT HEALTH
- SCORE ON SURVEY CONCERNING WILLINGNESS TO SEEK CARE
- SCORE ON SURVEY ABOUT SELF-ASSESSMENT OF HEALTH
- SCORE ON SURVEY ASSESSING ATTITUDES TOWARDS PHYSICIANS
- SCORE ON SURVEY ABOUT EXPECTATION OF SUCCESSFUL TREATMENT
- SCORE ON SURVEY OF PATIENTS' SATISFACTION WITH MILITARY HEALTH CARE
- SCORE ON AN INTERVIEW RELATED TO UNDERSTANDING OF CONDITION

FOR:

POPULATIONS
SERVED BY
SPECIFIC
MEDICAL
TREATMENT
FACILITIES (MTF)

In addition to the actual physical functioning of a patient or of a population generally, attitudes are important in determining well-being and are influenced by the health care received. They are usually assessed by a survey in which a standard set of questions is asked of respondents. The results are frequently scored numerically, and an index of attitudes, such as health-related anxiety, willingness to seek care, self-assessment of health, attitudes towards physicians, expectation of successful treatment, and satisfaction with health care, are developed. Related to attitudes is a patient's knowledge of his condition. Furthermore, one part of good quality care is educating a patient with respect to his condition. Thus, a patient's understanding of his condition is a useful measure of the quality of care he has received.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES: BEHAVIORAL

MEASURES AND INDICATORS

- FRACTION OF PATIENTS IN "SUBSTANTIAL" COMPLIANCE WITH PHYSICIAN ORDERS 2,11,12,13
- FRACTION OF POPULATION RECEIVING NON-SYMPTOM-INDUCED PERIODIC PHYSICAL EXAMINATIONS 10,31
- FRACTION OF POPULATION ENGAGING IN SPECIFIC HEALTH-IMPACTING BEHAVIOR PATTERNS (E.G., SMOKING, OVEREATING, SEDENTARY HABITS) 3
- FRACTION OF PATIENTS AWARE OF HAVING SPECIFIC HEALTH RISKS THAT MAKE ALTERED BEHAVIOR ADVISABLE FOR THEM 37

The fourth group of outcome measures and indicators describes the behavior of the patient population. Virtually no therapy is effective without the cooperation of the patient. Thus, the first behavioral measure is the fraction of patients who comply with the medical advice they receive. In addition, there are several preventive behaviors that can be influenced by the health care system. A commonly cited one is having a periodic physical examination. The fraction of the population receiving such examinations is an indicator of both the capability of the health care system to supply them and of the education of the population to seek them. Other behavior involves avoiding risks such as smoking, overeating, or immoderate use of alcohol, or developing health-promoting behavior patterns such as regular exercise and adequate rest. Finally, there are certain members of the patient population who are exposed to special risks and who can take steps to avoid these hazards, provided they are properly informed about their risks and the precautions to take. The fraction of the population exposed to these risks who are aware of them is another outcome measure.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES

OVERVIEW

- THE BEST APPROACH TO EVALUATING QUALITY, IDEALLY
- NO CONSENSUS ON
 - DEFINITION OF HEALTH
 - VALID MEASURES
- STATE OF THE ART IS PRIMITIVE
- MANY SIMPLE MEASURES USED
 - NARROW
 - E.G., DISEASE SPECIFIC INCIDENCE AND MORTALITY
 - BROAD AND INSENSITIVE
 - E.G., BED DISABILITY DAYS
- SIMPLE MEASURES REFLECTING QUALITY OF LIFE ARE
 - FEW
 - CONTROVERSIAL

CONTINUED p. 42

Affecting health is the avowed purpose of health care. Therefore the outcomes approach, ideally, is the best way to evaluate health care quality. If we could readily and easily determine outcomes, we would not need other measures of the quality of care. However, there are a number of practical limitations to defining, validating, and applying outcome measures.

In treating acute infectious diseases, which were the major health problems more than fifty years ago, outcomes were fairly well defined. The concern was whether the patient survived or died. If he survived, he was presumed healthy. Today, in treating different chronic conditions, the effects of successful treatment are changes in kinds and levels of impairment, i.e., in health status. They are different for different conditions. Currently, there is no agreed-upon definition of health, nor are there valid measures of health that can be universally applied to describe the effects of the health care system. While the WHO* definition of health is widely accepted, it does not lend itself well to measurement. At the present time, the state of the art of measuring health is primitive, and there is little agreement on proposed measures of health. Many simple measures have been used, ranging from fairly narrow, traditional ones, such as disease-specific mortality or incidence, to the more recent, broader measures of the Health Interview Survey, such as bed-disability days for acute conditions. These latter are very broad and correspondingly insensitive. There are few such measures that reflect quality of life in a satisfactory way, and these are controversial.

* "Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES

OVERVIEW (CONT.)

- DATA COLLECTED ROUTINELY AND GENERALLY ONLY FOR: MORTALITY
 - QUALITY OF LIFE NOT REFLECTED
 - REFLECT NON-HEALTH CARE FACTORS
 - ENVIRONMENTAL
 - POPULATION PECULIARITIES
 - FREQUENTLY REQUIRES LONG-TERM STUDY
- A LOW CONTROVERSY MORBIDITY MEASURE: AMOUNT OF TIME HEALTHIER THAN A SPECIFIED IMPAIRMENT LEVEL
 - QUALITY OF LIFE ONLY PARTIALLY REFLECTED
 - MANY LEVELS TO BE DEFINITIVE
 - REFLECTS NON-HEALTH CARE FACTORS
 - FREQUENTLY REQUIRES LONG-TERM STUDY
 - EFFECTS ON NON-HEALTH CARE FACTORS REDUCED BY STUDY DESIGN
 - COMPARE SIMILAR POPULATION SEGMENTS
 - MEASURE CHANGES

The only measure for which data are routinely and generally collected is mortality. The standard death certificate reports age, sex, and residence of the decedent, as well as the cause of death. Also, mortality is probably the least controversial measure of health. However, mortality data reflect little about the quality of life for the living. Further, in addition to health care, mortality data reflect non-health care factors, such as the environment and peculiarities of a population.

A relatively noncontroversial morbidity measure is "amount of time healthier than a specified impairment level." However, this measure is affected by some of the same limitations as mortality. It is a relatively gross measure that does not completely reflect the quality of life. To completely reflect the quality of life would require many levels of impairment. Finally, this measure reflects environmental factors and peculiarities of a particular population. These limitations can be reduced by careful study design, for example, comparing similar segments of the population and measuring changes.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES

OVERVIEW (CONT.)

- ONLY MORBIDITY DATA COLLECTED ROUTINELY: NATIONAL HEALTH SURVEY
 - MEASURES
 - PREVALENCE OF CERTAIN CONDITIONS
 - BED-DISABILITY DAYS
 - RESTRICTED ACTIVITY DAYS
 - WORK-LOSS DAYS
 - LIMITED NATIONAL SAMPLE
 - SELF-REPORTING ERROR
- NO SIMPLE MEASURE COMPLETE
- ONLY INDICES COMPREHENSIVE
 - VALIDITY AND SENSITIVITY
 - JUDGMENTAL INPUT
 - CONTROVERSIAL
- ATTITUDINAL AND BEHAVIORAL MEASURES

CONTINUED P. 15

The only data that are collected routinely on morbidity are those collected by the National Health Survey. They are collected for prevalence of certain conditions, bed-disability days, restricted-activity days, and work-loss days. Unfortunately, they are only collected on a sample of the national population and are subject to self-reporting errors.

In general, no single simple measure of health reflects the effects of the health care system with any degree of completeness. In an attempt to do this, a number of indices have been developed that combine several simple measures into a comprehensive measure of health. Examples are the Health Status Index of Bush, the Activities of Daily Living Index developed by Katz, and the Sickness Impact Profile of Bergner and her coworkers. These indices combine a person's score on a number of questions to get an overall numerical expression of health status. Theoretically, indices are a satisfactory way to represent the health of a population or of an individual. However, there has been little work that compares indices to other measures of health in order to establish validity, and almost nothing is known about the sensitivity of the indices to changes in care. Finally, the scaling and adding of the different items in the index involve significant judgmental input. Thus, these indices are open to considerable controversy.

Two final types of outcome indices are based on patient attitudes and behavior. Several studies have examined reported satisfaction with the health care system and compliance with physicians' advice. There is little question that the health care system can affect patient attitudes and behavior; however, the place of these indices in evaluating health care quality is not fully settled.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES

OVERVIEW (CONT.)

- LONG-TERM IMPACT
- CONTROLLED TRIAL REQUIRED FOR DEFINITIVE RESULTS
 - ETHICAL CONSIDERATIONS
 - SIZE OF POPULATION
 - NUMBER OF TEST SITES
 - COST
 - MAINTAINING POPULATION

CONTINUED p. 48

Thus far, we have discussed primarily the outcome or health measures themselves, their definitions, and the data required to apply them. Additional limitations arise when we attempt to use these measures and indicators to evaluate the quality of a health care system through outcomes or to evaluate through outcomes the effect on quality of some innovation to the system. The first of these limitations is the extended time period during or before which health care has an effect. In the past, when acute infectious diseases were the major health concerns, patients either died or recovered fairly promptly. Today, our major health problems are either chronic, such as cancer, arthritis, and diabetes or are the acute result of what we now recognize as a chronic process, such as myocardial infarction. Successful treatment and/or prevention may delay the onset of or may slow or stop the progress of these conditions, and their impact will be apparent over or after long periods of time.

A second set of difficulties arises because definitive demonstration of differences in outcome for different treatments or different health care processes require that human subjects be assigned randomly to study and control groups in a controlled trial. This is ethically impossible if there are good reasons for believing one treatment or process is more effective than present methods. Thus, belief can preclude definitive proof of effectiveness. In many situations, the size of the study population required for statistically significant results is large. In comparing innovations in health care with current modes of care, one would like a number of test sites. Thus, controlled trials tend to be large efforts and correspondingly expensive. Another difficulty of the controlled trial is that members of both study and control groups tend to lose contact with the experiment over time. Finding these subjects requires expensive followup. If they are not found, the conclusions of the trial become questionable.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES

OVERVIEW (CONT.)

- BEFORE-AFTER TRIAL COMMON
 - INTERVENING FACTORS
 - CAUSAL INFERENCE
- OVERALL FEASIBILITY OF EVALUATING IMPACTS ON QUALITY
 - DIFFICULT AT BEST
 - VERY LIMITED EXCEPT WHEN IMPACTS ARE
 - PROMPT AND PRONOUNCED
 - LATER BUT VERY PRONOUNCED

Another method of testing an innovation is to compare outcomes before and after introducing it. A significant problem with this approach is that other factors may change and may affect outcomes. The evaluator is never sure how much of the observed change is due to the intervening factor and how much to the innovation. Furthermore, there is always the possibility of an unknown intervening factor operating. Thus, a causal inference based on a before-after trial always involves the judgment of the evaluator.

In summary, evaluating the impact on quality of an innovation in terms of general health outcomes is seldom feasible and then usually difficult, at best. Generally, feasibility occurs mainly in those situations when changes because of an innovation occur promptly and are pronounced. If the effects occur over a long period of time they must be very pronounced in order to infer causal relations between the innovation and the specific health outcome.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF OUTCOMES

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QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

DEFINITION

THE CORRECTNESS, COMPLETENESS, AND TIMELINESS OF
ORDERING AND ADMINISTERING DIAGNOSTIC AND
THERAPEUTIC HEALTH CARE PROCEDURES TO PATIENTS

Quality of health care in terms of the process is the correctness, completeness, and timeliness of ordering and administering diagnostic and therapeutic health care procedures to patients. Implicit in evaluating quality according to this definition is that when a "proper" process is used, good quality health care is rendered. The definition does not assume or imply a relationship between process and outcome.

By this definition, the process of care comprises what the care providers do for the patient or instruct the patient to do himself. Thus, it does not include the behavior of patients in avoiding risks or in complying with care instructions. Since such behavior is important in determining a patient's health we could have elected to discuss it as part of process rather than of outcome.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

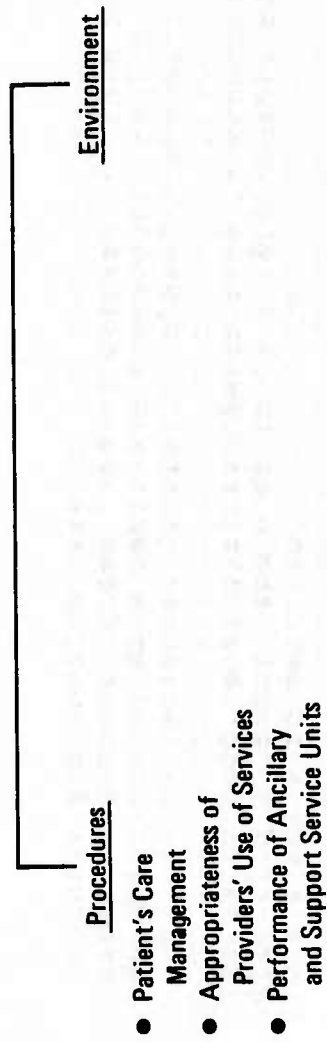
RATIONALE

- BELIEF IN THE RELATIONSHIP OF PROCESS TO OUTCOMES IS THE BASIS FOR THE EXISTENCE OF ANY HEALTH CARE DELIVERY SYSTEM
- CORRELATION OF THE PROCESS OF CARE WITH OUTCOMES
 - DEMONSTRABLE FOR CERTAIN CONDITIONS AND RELATED PROCESS AND OUTCOMES (E.G., IMMOBILIZATION FOR BONE FRACTURES)
 - NOT YET SUBSTANTIATED FOR OTHER CONDITIONS AND RELATED PROCESSES
- FEASIBILITY OF EVALUATING GREATER THAN FOR OUTCOMES

The health care delivery system has been developed and maintained on the assumption that the process of health care contributes to improved outcomes. The correlation between process and outcomes is well established for some disease and/or injury conditions (e.g., immobilization for bone fractures). For some other conditions, such a correlation has been neither proved nor disproved. When a clear correlation between process and outcome exists, the excellence of the process is important. Where such a correlation is believed to exist, the excellence of the process must be assumed to be significant even though unproved.

Process measures of quality that are believed to be valid are often a desirable alternative to outcome measures because of the greater feasibility of defining criteria for applying them.

**SUBAREAS OF EFFECTIVENESS AND
MAJOR KINDS OF MEASURES AND INDICATORS
FOR QUALITY EVALUATED IN TERMS OF THE PROCESS**



The process of health care comprises two subareas for which we have identified measures and indicators of quality. The first includes all procedures, both diagnostic and therapeutic, accomplished in patient care management. The second embraces environmental factors, such as noise, which may affect the administration of diagnostic and/or therapeutic procedures.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS: PROCEDURES

MEASURES AND INDICATORS

- RESULTS OF COMPARING A PATIENT'S MANAGEMENT (DIAGNOSIS AND THERAPY) WITH ACCEPTED STANDARDS FOR THE GIVEN CONDITION *
- RESULTS OF SUBJECTIVE ASSESSMENT BY EXPERIENCED CLINICIANS OF A PATIENT'S MANAGEMENT +
- VARIANCE OF THE PATTERN OF ORDERS (INCLUDING PHARMACEUTICALS, DIAGNOSTIC TESTS, SURGERY, ETC.) OF AN INDIVIDUAL CARE PROVIDER FROM THE EXPECTED PATTERN, DERIVED FROM THE PRACTICE OF OTHERS IN THE SAME SPECIALTY 2,13
- VARIANCE OF THE PATTERN OF ORDERS (INCLUDING PHARMACEUTICALS, DIAGNOSTIC TESTS, SURGERY, ETC.) FOR AN INDIVIDUAL HEALTH CARE FACILITY FROM THE EXPECTED PATTERN FOR SUCH A FACILITY 11,12,28

* See references 1,2,4,6,7,8,10,13,14,16,17,18,20,22,24,28

+ See references 1,4,7,8,11,13,14,18,19,21,22,28

CONTINUED p. 64

This chart shows four measures and indicators that can be used to assess quality in terms of process. The first two are similar in that both are results of reviewing an individual patient's management. The major difference between them is the manner in which the norms used for review are established. In the first case norms are predetermined by the consensus of a group of medical professionals. In the second instance the reviewer uses subjective norms based on his own experience. The particular means used to express the results of such a review varies, but a typical choice is to categorize the treatment for each case as "highly satisfactory," "adequate," or "inadequate."

The third and fourth entries are not concerned with individual cases as are the first two; they describe cross sections of medical care instead. The third is used to review the pattern of orders by an individual care provider, while the fourth deals with patterns of orders for a facility as a whole. This approach has been used to identify abuses of particular procedures and/or medications.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS: PROCEDURES (CONT.)

MEASURES AND INDICATORS

- RANGE OF DEVIATION FROM STANDARDS OF DIAGNOSTIC TEST RESULTS,
BY KIND OF TEST, PATIENT COHORT, AND MTF
- PERCENT OF INPATIENT BED-DAYS SPENT IN APPROPRIATE BED-SECTION 23
- AVERAGE LENGTH OF STAY (INPATIENT) BY DIAGNOSIS 18,25
- AVERAGE NUMBER OF FOLLOWUP VISITS (OUTPATIENT) PER COMPLAINT
EPISODE BY KIND OF COMPLAINT 15
- NUMBER OF PREVENTABLE CONDITIONS (E.G., BEDSORES) CONTRACTED
BY PATIENTS DURING HOSPITAL STAYS

CONTINUED p. 66

The first item of four on this chart is frequently used to evaluate the skill and care with which diagnostic tests are performed. This is important in the quality of the care process, since decisions about therapy are often based on diagnostic test results. Determining deviation of test results from accepted standards is familiar for several types of diagnostic tests, including some laboratory tests. This measure must be used with great care. The amount of deviation from standards that is tolerable depends on many variables, including some that are patient specific.

Use of the second measure requires that a trained observer visit each patient in a selected sample daily. The observer then makes a judgment about the appropriateness of the patient's location. The judgment is generally based on predetermined functional criteria such as reliance on mechanical support for respiration.

The third and fourth items are similar to each other. The third deals with duration of treatment (length of stay) for an inpatient; the fourth deals with duration of treatment (number of visits) for an outpatient. The inpatient measure has the advantage that it is a routinely reported statistic. The outpatient one could be gleaned from a review of outpatient records.

The last measure concerns conditions (e.g., bedsores) that can be prevented by adequate care procedures. A similar measure in the environment subarea concerns preventable conditions contracted because of environmental factors. Identifying preventable conditions will often require medical judgments.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS: PROCEDURES (CONT.)

MEASURES AND INDICATORS

- RATIO OF THE NUMBER OF NORMAL APPENDICES REMOVED TO THE TOTAL NUMBER OF APPENDICES REMOVED
 - NUMBER OF PRESCRIPTIONS FILLED, BY KIND
 - NUMBER OF PROCEDURES ORDERED PER PHYSICIAN BY KIND OF PROCEDURE AND PHYSICIAN SPECIALTY
 - PERCENT OF PROCEDURES ORDERED, BY KIND OF PROCEDURE, CLASSIFIED AS INAPPROPRIATE ORDERS
 - NUMBER OF PROCEDURES PER PHYSICIAN THAT SHOULD HAVE BEEN ORDERED BUT WERE NOT, BY KIND OF PROCEDURE AND PHYSICIAN SPECIALTY
 - PERCENT OF PROCEDURES ORDERED, BY KIND OF PROCEDURE, THAT ARE ADMINISTERED
 - PERCENT OF PROCEDURES ORDERED AND ADMINISTERED THAT ARE ADMINISTERED WITHIN AN ACCEPTABLE TIMEFRAME, BY KIND OF PROCEDURE
- FOR BOTH
DIAGNOSTIC
AND
THERAPEUTIC
PROCEDURES

All measures and indicators on the preceding two charts and all except the last on this chart deal either with the adequacy of clinical decision-making or the skill with which procedures are administered. A third important dimension of the quality of the process is timeliness, which is considered in the last entry on this chart.

The first two are the only items on this chart for which data can be easily collected. Although these data are objective, subjective judgment would be required to use them in drawing an inference about quality. The first measure could also be regarded as an outcome measure for some evaluations.

Data for the last five measures would have to be collected by reviewing clinical records. This is time consuming and costly. An additional complication is present for the two items (the third and the fifth) that require data to be collected for each physician. Medical information is recorded by patient rather than by physician, and several physicians may participate in one episode of inpatient care.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS: ENVIRONMENT

MEASURES AND INDICATORS

- SCORE ON SURVEY OF PATIENTS ABOUT PSYCHOLOGICAL ASPECTS OF CARE (E.G., COMPASSION AND SUPPORT SHOWN BY STAFF) 1,5,8
- CORRIDOR NOISE LEVELS BY LOCATION, IN DECIBELS
- SCORE ON SURVEY OF PATIENTS ABOUT CLEANLINESS IN PATIENT ROOMS, BATHS, CORRIDORS, WAITING AREAS
- NUMBER OF PREVENTABLE CONDITIONS (E.G., SOME TYPES OF INFECTIONS) CONTRACTED BY PATIENTS DURING HOSPITAL STAYS

Considering the patient's environment in evaluating the quality of the process is intuitively appealing but difficult to accomplish. The first and third measures shown here are highly subjective. They reflect the patients' impressions of two important facets of care, psychological aspects and cleanliness of the facility. The second is an objective measure that would be made at various locations within the facility. The last item requires the identification of hospital-contracted conditions that are preventable. It may be difficult to determine whether some conditions could have been prevented through environmental controls. The effective control of such problems is one indication of quality.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

OVERVIEW

- STATE OF THE ART
 - PRIMITIVE
 - UNDER CONCERTED DEVELOPMENT
 - MOST DEVELOPMENT FOR INPATIENT CARE, LITTLE WORK FOR AMBULATORY CARE
- USE CONTROVERSIAL
 - REVIEW OF INDIVIDUAL PROVIDERS
- RELATION TO OUTCOMES
 - NOT ESTABLISHED
 - CONSTRAINED BY LACK OF CONSENSUS AND INABILITY TO APPLY OUTCOME MEASURES

CONTINUED p. 72

In the past few years, there has been considerable attention on assessing quality of health care in terms of the health care process. The state of the art of process assessment is primitive, but its development is considered essential for both improved quality control and cost containment. Most work in developing methods for evaluating the care process has been done for inpatient care. Relatively little has been done to develop process measures for outpatient care. This is partly because ambulatory care episodes are not as well defined and recorded as inpatient episodes.

The use of process measures to assess and control quality is highly controversial since it frequently involves reviewing medical decisions and clinical judgment in individual cases of patient care.

A relationship between the care process and care outcomes is implied by the use of process measures to assess quality. This relationship has not been well established except for specific outcomes of a few disease entities. Two major constraints to demonstrating the relationship are the lack of consensus on outcome measures and the inability to apply them. These are discussed in the preceding section of this report.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

OVERVIEW (CONT.)

- RELATION TO OUTCOMES (CONT.)
 - CURRENT PROCESS MEASURES THEY DO NOT REFLECT
 - PATIENT COMPLIANCE
 - OUTPATIENT CARE
 - REQUIRES CONTROLLED TRIAL FOR DEFINITIVE RESULTS
 - A MAJOR PRESENT USE: TO IMPROVE CARE
 - COULD INVALIDATE EVALUATION OF OTHER IMPACT

CONTINUED p. 74

In addition, most process measures currently in use focus on the actions of the care provider in a hospital and do not include factors such as patient compliance and outpatient care. For many of the measures the inpatient clinical record is the only data source, and followup outpatient care is not included in these records. Inpatient records thus do not completely describe the care given or the final outcome. Measures that rely on them are useful only for attempts to determine a correlation of process with the immediate outcome of an inpatient stay. Another difficulty in establishing a process-outcome correlation is that a controlled trial would be required to obtain definitive results. Issues related to conducting controlled trials have been discussed in the preceding section of this report.

A major present use of process measures is to identify areas where improvement in care can be achieved. Reviewers hope to affect a change in treatment techniques by communicating to the care provider the results of the process review. If this kind of review were being conducted at the same time as an attempt to evaluate the impact of an innovation, changes caused by the review could invalidate the evaluation of the innovation.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

OVERVIEW (CONT.)

- REQUIRED BY PSRO (P.L. 92-603, 1972)
 - BASIS FOR PAYMENT
 - DOD HAS ELECTED TO CONDUCT REVIEWS
 - STANDARDS
 - EXPLICIT
 - PRIOR TO REVIEW
 - DIAGNOSIS-SPECIFIC
 - PROFESSIONAL CONSENSUS
 - IMPLICIT
 - JUDGMENT DURING REVIEW
 - USUALLY MEDICAL RECORD REVIEW
 - LIMITED TO RECORDED INFORMATION
 - MOTIVATES MORE COMPLETE RECORDING OF INFORMATION

CONTINUED p. 76

Federal legislation (P.L. 92-603, 1972) requires establishment of regional Professional Standards Review Organizations (PSROs) to conduct peer review of treatment that may be paid for under the Medicaid, Medicare, or Maternal and Child Health programs. The DOD has elected to conduct similar reviews even though it is not required by law to do so. The legislation has generated considerable activity in developing experimental review groups. Either explicit or implicit criteria are used as standards for the review. Explicit criteria are developed prior to the review and are generally diagnosis-specific. The explicit criteria are usually established by the consensus of a group of experienced medical professionals. Criteria are implicit when professionals review treatment and judge its adequacy based on their own experience rather than predetermined standards.

The most widely used method of applying either implicit or explicit standards is review of medical records. This limits reviews to recorded information. However, this method has the advantage that the data required for inpatient review are currently collected.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

OVERVIEW (CONT.)

- ALTERNATIVE REVIEW METHODS
 - DIRECT OBSERVATION
 - UNRECORDED ASPECTS ASSESSABLE
E.G., TENDER LOVING CARE
 - TIME-CONSUMING, EXPENSIVE
 - DISRUPTIVE
 - GENERALLY IMPRACTICAL
 - IMPLICIT REVIEW
 - RELIABILITY LOW
 - ONLY SOMEWHAT LESS TIME-CONSUMING AND EXPENSIVE
 - EXPLICIT REVIEW
 - USUAL CHOICE
 - CONSIDERABLY LESS COSTLY
 - RECORDS INCOMPLETE, INACCURATE, POORLY LEGIBLE
 - ESTABLISHING CONSENSUS CRITERIA REQUIRES TIME

CONTINUED p. 78

The choice of method for review is important since there is evidence that quite different results are obtained when different methods are used to assess the same care process. Direct observation has the advantage of allowing assessment of aspects of care that cannot be included in a record audit. An example is the degree of "tender loving care" evidenced by the staff. However, direct observation is very expensive, time-consuming, and potentially disruptive to the care process itself. These considerations virtually eliminate direct observation as a practicable method or process review. Implicit criteria are not frequently used because variations among reviewers' assessments of treatment make the reliability of such reviews low. Implicit reviews are also expensive, since each chart must be reviewed by at least one physician.

Due to the difficulties of implicit review and direct observation, medical record audit using explicit criteria is the usual method of choice. This method, however, involves several limitations of its own. The records themselves may often be incomplete, inaccurate, or illegible. Some claim that the problem-oriented medical record facilitates review; others have abstracted the record to present only the information relevant to the topic under review. The development of criteria requires considerable physician time since a consensus of experts is the usual method. Generally, medical staff members prefer that the criteria be developed locally, although sets of criteria are currently being published by various groups [e.g., the American Medical Association (AMA)]. As medical technology advances, additional physician time will be required to update the criteria.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

OVERVIEW (CONT.)

- OTHER LIMITATIONS
 - ONLY SELECTED CONDITIONS, GENERALIZATION UNCERTAIN
 - CHANGES DURING EVALUATION
 - STANDARDS OF CARE
 - INFORMATION AVAILABLE
 - ESTABLISHING CAUSALITY
- OVERALL FEASIBILITY DEPENDENT ON
 - INNOVATION
 - PROCESS MEASURE

Process evaluations are usually disease or condition specific, and only certain conditions are selected for evaluation. Conclusions about quality can be made only for the conditions under study. It is not possible to generalize these conclusions to statements about the level of care in the whole facility.

If the quality of the care process is assessed before and again after the introduction of some innovation, the time lag between observations creates an opportunity for factors to intervene other than those to be evaluated. Standards of care may change; or, as mentioned previously, treatment techniques could change. Also, the information available for evaluation may change during the evaluation period. For example, if a manual system of recordkeeping is converted to an automated system during an evaluation of some other innovation, the nature and accuracy of recorded information is likely to change. Preinnovation and postinnovation reviews would not be readily comparable. In general, any changes during the evaluation can invalidate the results and will at least introduce uncertainty about the results. A related limitation to this kind of evaluation is the need to establish a causal link between the innovation and an observed change in a measure. The significance of the limitation can vary depending on how directly the measure is affected by the innovation.

In summary, many measures have been suggested and studied for evaluating health care quality in terms of the process. Their use is controversial, and much effort is still needed to develop and validate standards and methodologies for applying them. Nevertheless, it is feasible to collect data and apply a number of them. Using them to evaluate an innovation entails additional limitations that apply in all areas of effectiveness. It is necessary to identify and account for effects of changes during the evaluation and to establish the innovation's role in producing observed changes. The overall feasibility of evaluating an innovation depends on the specific innovation and the particular process measures used.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF THE PROCESS

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5. QUALITY-STRUCTURE

QUALITY OF HEALTH CARE EVALUATED
IN TERMS OF STRUCTURE

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE

DEFINITION

THE EXTENT TO WHICH RESOURCES
AVAILABLE TO PROVIDE HEALTH
CARE MEET THE EXPECTATIONS
OF THE HEALTH CARE COMMUNITY

Evaluation of health care quality in terms of structure is assessment of the extent to which resources available to provide care meet the expectations of the health care community. Assessment of available resources includes consideration of the existing equipment and manpower, as well as the way they are organized. (See the definition of "Availability of Health Care" in this report.)

As discussed in the section on outcomes, the health care community is very broad. The expectations referred to here have diverse origins and forms. They may include congressionally mandated health objectives, results of health services research, standards of accrediting bodies, as well as other expectations based on current ideas about health care quality. These expectations must be studied and refined before selecting criteria for evaluation.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE

RATIONALE

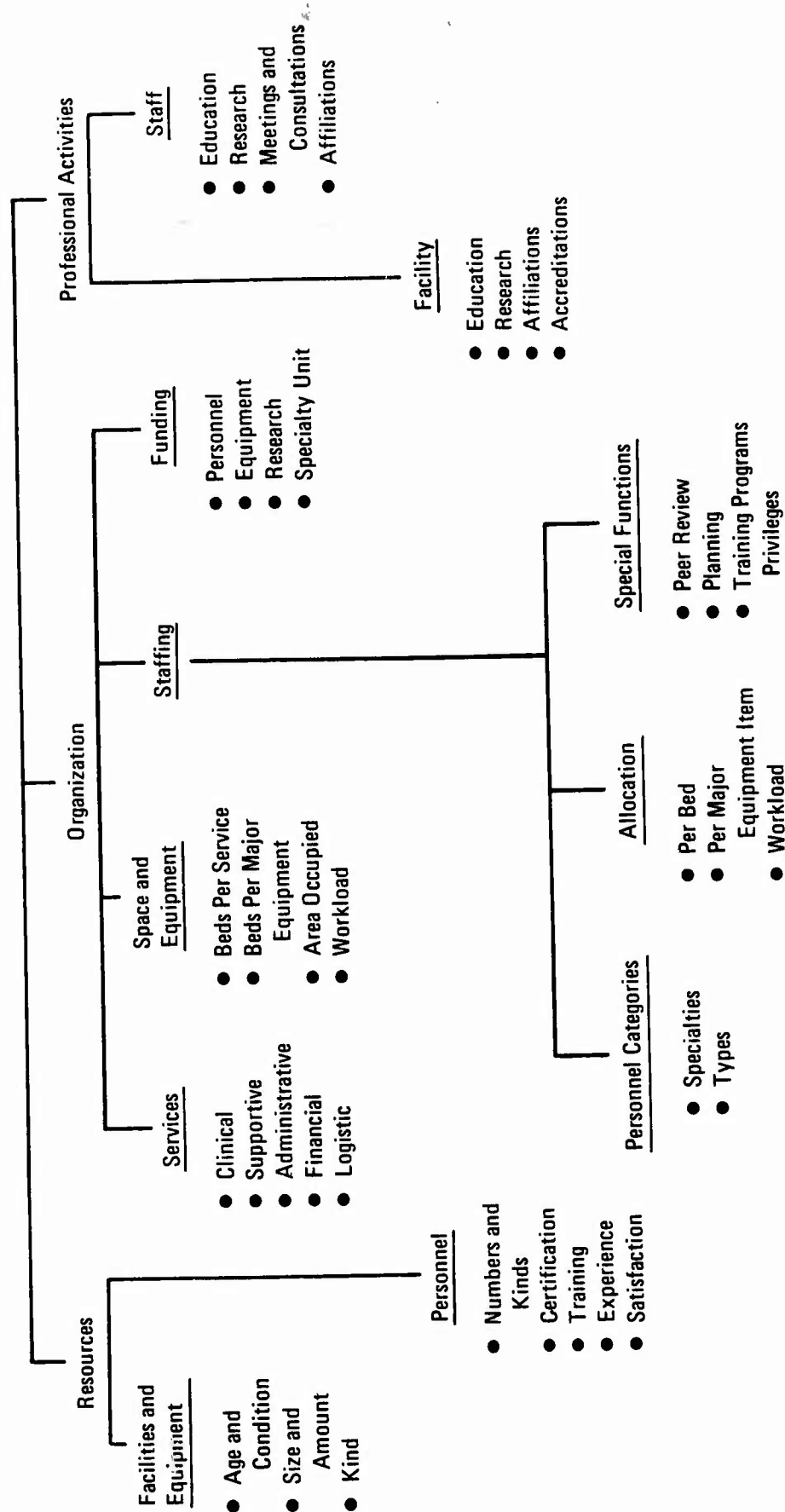
- INTUITIVELY, HIGH QUALITY HEALTH CARE SHOULD BE ASSOCIATED WITH HIGH STANDARDS IN STRUCTURAL MEASURES

- MEASURES AND INDICATORS ARE CONCRETE, QUANTITATIVE

- INFORMATION IS EASY TO OBTAIN

Evaluation of quality in terms of structure assumes that structural characteristics such as equipment and medical staff qualifications affect the outcomes of health care. Such a cause and effect relationship between structure and health care outcomes has not been firmly established. Probably the strongest motivation for this approach to evaluation of quality is that the measures and indicators are concrete and quantitative. Furthermore, the information required for this kind of evaluation is generally quite easy to obtain.

CATEGORIES AND KINDS OF MEASURES AND INDICATORS FOR QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE



For discussion, we have separated structural measures and indicators of the quality of health care into three broad categories. The first contains measures and indicators of the relatively fixed characteristics of the available resources. We discuss two kinds of resources, facilities and equipment, and personnel.

The measures and indicators in the second category address the way resources are organized and used to provide care. Four aspects of organization are discussed separately: organized services, space and equipment, staffing, and funding. Measures and indicators of staff organization are further divided into three groups. One group assesses the mix of personnel categories, another staff allocation, and the third specially organized functions.

The final category comprises measures and indicators of participation in professional activities that might contribute to an improved capability to provide care. Professional activities of the facility as a whole and those of staff members are considered separately.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

RESOURCES, FACILITIES AND EQUIPMENT

MEASURES AND INDICATORS

- AGE OF FACILITY, EACH BUILDING
- NUMBER AND AVERAGE AGE OF MAJOR EQUIPMENT ITEMS PRESENT BY KIND (INCLUDING BOTH MEDICAL AND OTHER EQUIPMENT)
- PHYSICAL CONDITION RATING OF FACILITY, EACH BUILDING
- AVERAGE PHYSICAL CONDITION RATING OF MAJOR EQUIPMENT ITEMS BY KIND (INCLUDING BOTH MEDICAL AND OTHER EQUIPMENT)
- SIZE OF FACILITY, EACH BUILDING IN SQUARE FEET OF FLOOR SPACE
- TOTAL BED CAPACITY (NORMAL AND EXPANDED) 10
- NUMBER AND KINDS OF MAJOR TASKS PERFORMED OR ASSISTED BY A COMPUTER
- COMPLIANCE WITH FIRE AND BUILDING CODES

The first group of measures and indicators of care resources is facilities and equipment. These measures describe the kinds, amounts, and conditions of the physical resources (other than personnel) that are available.

Measures shown on this chart include those of size, age, physical condition rating, and bed capacity of buildings comprising the facility or system considered. Also included are descriptions of the kinds, ages, and physical conditions of major equipment items in the facility or system.

The second measure from the bottom, related to computerized equipment, is in terms of the tasks that are computer assisted. Knowing what computer equipment is present provides no information about which tasks are performed automatically, and thus no information about the contributions of the equipment to health care. The same computer may perform a number of different major tasks according to its configuration and programming.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

RESOURCES, PERSONNEL

MEASURES AND INDICATORS

- TOTAL NUMBER OF PROFESSIONAL PERSONNEL BY PERSONNEL CATEGORY
- AVERAGE OVERALL OCCUPATIONAL SATISFACTION OF PERSONNEL BY SERVICE AREA AND KIND OF PERSONNEL⁹
- NUMBER AND PERCENTAGE OF PHYSICIANS BY SPECIALTY WITH SPECIALTY BOARD CERTIFICATION¹⁰
- AVERAGE NUMBER OF YEARS PER CERTIFIED PHYSICIAN BY SPECIALTY BETWEEN AWARD OF M.D. DEGREE AND SPECIALTY BOARD CERTIFICATION¹⁰
- NUMBER AND PERCENT OF NON-PHYSICIAN PERSONNEL WITH RELEVANT CERTIFICATION BY PERSONNEL CATEGORY
- AVERAGE NUMBER OF YEARS EXPERIENCE PER STAFF MEMBER BY PERSONNEL CATEGORY AND KIND OF SERVICE AREA⁹
- AVERAGE NUMBER OF MONTHS SERVED IN RESIDENCY PROGRAMS PER PHYSICIAN BY SPECIALTY
- PERCENT OF PROFESSIONAL STAFF MEMBERS IN UPPER 25% OF CLASS⁹
- AVERAGE NUMBER OF PROFESSIONAL OR SCIENTIFIC AWARDS DURING CAREER PER STAFF MEMBER BY PERSONNEL CATEGORY AND PROFESSIONAL SPECIALTY⁹

The measures and indicators on this chart concern characteristics of personnel. These characteristics are thought to be associated with personnel capabilities to provide high quality care. The first measure or indicator is the average total number of professional personnel by category. The others concern staff satisfaction, specialty board and other certifications, experience, prior training and education, and professional or scientific awards.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

ORGANIZATION, SERVICES

MEASURES AND INDICATORS

FOR EACH CATEGORY, NUMBERS AND KINDS OF SERVICES OFFERED:

- CLINICAL
- SUPPORTIVE
- ADMINISTRATIVE
- FINANCIAL
- LOGISTIC

BY MTF, MILITARY DEPARTMENT, DEFENSE HEALTH CARE REGION,
AND SYSTEMWIDE

A health care facility or system is organized around the services it is able to provide. As this chart shows, these services may be classified as Clinical, Supportive, Administrative, Financial, and Logistic. Associated with each service is some organization of space and equipment, staffing, and funding. Measures and indicators of these aspects of organization are presented in the following pages.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

ORGANIZATION, SPACE AND EQUIPMENT

MEASURES AND INDICATORS

- NUMBER AND PERCENT OF TOTAL BEDS ASSOCIATED WITH EACH KIND OF CLINICAL SERVICE OR SPECIALIZED UNIT ²

- AVERAGE NUMBER OF BEDS PER NURSING UNIT BY KIND OF CLINICAL SERVICE OR SPECIALIZED UNIT

- AVERAGE NUMBER OF ASSOCIATED BEDS PER ITEM OF MAJOR MEDICAL EQUIPMENT BY KIND

- AVERAGE AREA PER BED IN PATIENT ROOMS (NORMAL AND EXPANDED)

- AVERAGE AREA (IN SQUARE FEET OF FLOOR SPACE) AND NUMBER OF ROOMS OCCUPIED PER SERVICE UNIT, BY TYPE (INCLUDING, FOR EXAMPLE, NURSING UNITS BY KIND, SURGICAL SUITES, OUTPATIENT CLINICS, AND ALL PARACLINICAL, ANCILLARY, AND SUPPORT AREAS)

- RATIOS OF ASSOCIATED MAJOR EQUIPMENT ITEMS AND OTHER SUPPORT TO WORKLOAD, BY KIND OF WORKLOAD

Measures and indicators of the organization of space and equipment describe the arrangements for providing services of major equipment items and space.

The first four of these measures and indicators involve beds which represent potential patients. Thus, the distribution of beds within a facility or system, by clinical service, specialized unit, nursing unit, item of major medical equipment, or the ratio of beds to floor space in patient rooms, gives a broad indication of which kinds of resources may be used to provide which kinds of care to how many patients.

In many instances, the areas occupied by various service units are adjustable. Thus, we have included the average area occupied by service units in our list of measures and indicators. This may provide insight into a facility or system's priorities and capabilities.

All facility or system resources should be organized to best meet the workload. We have, therefore, included the last measure, ratios of associated major equipment items and other support to workload. Similar measures that relate organizational features to the workload are included in the two following subcategories—staffing and funding—of the organization measures and indicators.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

ORGANIZATION, STAFFING

MEASURES AND INDICATORS

PERSONNEL CATEGORIES

- NUMBER AND PERCENT OF TOTAL PERSONNEL IN EACH PERSONNEL CATEGORY AND SPECIALTY

- RATIOS OF NURSES, TECHNICIANS, PHYSICIANS' ASSISTANTS AND OTHER CATEGORIES OF PROFESSIONAL AND PARA-PROFESSIONAL PERSONNEL, BY KIND, TO PHYSICIANS

- RATIOS OF PROFESSIONAL PERSONNEL TO TECHNICIANS AND TO SUPPORT PERSONNEL BY SERVICE AREA 10

- RATIOS OF MEDICAL PERSONNEL TO NON-MEDICAL PERSONNEL BY KIND 10

CONTINUED p. 100

The distribution of the facility or system staff among personnel categories is subject to managerial control and may reflect the organization's objectives, as well as the quality of care. The first group of staffing measures and indicators are related to personnel categories. They describe kinds of personnel and relationships between the numbers of various kinds of personnel.

The first measure shown is the number of personnel by category and specialty. The remaining ones are ratios of numbers of various kinds of personnel to one another. For example, it may be important to know not only how many administrators are in a facility's employ, but also how many administrators there are in relation to the numbers of physicians.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

ORGANIZATION, STAFFING (CONT.)

MEASURES AND INDICATORS

ALLOCATION

- AVERAGE NUMBER OF ASSOCIATED PERSONNEL, BY CATEGORY, PER BED
- AVERAGE NUMBER OF ASSOCIATED PERSONNEL, BY CATEGORY, PER SERVICE AREA, BY KIND
- AVERAGE NUMBER OF ASSOCIATED PERSONNEL, BY CATEGORY, PER ITEM OF MAJOR MEDICAL EQUIPMENT, BY KIND
- RATIO OF ASSOCIATED COMPLEMENTS OF PERSONNEL TO WORKLOAD, BY KIND OF WORKLOAD

CONTINUED P. 102

The next group of staffing measures and indicators concerns the way the staff is allocated to provide service. The first three measures consider staff allocation per bed, per service area by kind, and per item of major medical equipment by kind.

We have also included in this group a measure, the last one shown, that relates staffing to workload. Use of this measure assumes that a facility or system well staffed to meet its demands will deliver higher quality care than one poorly staffed.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

ORGANIZATION, STAFFING (CONT.)

MEASURES AND INDICATORS

SPECIAL FUNCTIONS

- PRESENCE OF PROCESSES FOR REVIEWING CARE QUALITY
- EXISTENCE OF PRE-ADMISSION TESTING PROGRAMS 11
- NUMBER AND KINDS OF SPECIAL SURGICAL AND MEDICAL TEAMS
- EXISTENCE AND EXTENT OF DISASTER AND OTHER EMERGENCY PLANNING (SEE MEASURES AND INDICATORS OF RESPONSE TO CHANGING NEEDS: PREPAREDNESS OF SYSTEM FOR SUDDEN CHANGE)
- EXISTENCE OF MANAGEMENT ENGINEERING PROGRAMS 11
- EXISTENCE AND EXTENT OF IN-SERVICE TRAINING PROGRAMS
- NUMBER OF RESIDENTS IN TRAINING PROGRAMS AT FACILITY, BY SPECIALTY 3
- AVERAGE NUMBER OF PERSONS COMPLETING RESIDENCY TRAINING PROGRAMS AT FACILITY PER YEAR, BY SPECIALTY 3

This chart shows measures and indicators that address special functions the facility or system staff members are organized to perform. These are functions other than standard facility maintenance and routine medical procedures. They may be direct care functions of a special nature or support functions such as training. The first and fifth measures are concerned with two very different programs--peer review and management engineering--which monitor and improve different aspects of the care process. The second and third measures deal with the way care is provided, and the fourth with a planning function. The remaining ones consider the existence of, and participation in, training programs.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

ORGANIZATION, FUNDING

MEASURES AND INDICATORS

- AVERAGE DOLLAR AMOUNT OF RESEARCH SUPPORT PER
YEAR FROM ALL SOURCES (TOTAL AND PER BED)³
- AVERAGE DOLLAR AMOUNT OF SUPPORT FOR PILOT OR
EXPERIMENTAL PROGRAMS
- PERCENTAGE OF TOTAL DOLLAR SUPPORT BY KIND OF
SPECIALIZED UNIT
- PERCENTAGE OF TOTAL DOLLAR SUPPORT BY MAJOR
EQUIPMENT TYPE
- RATIOS OF TOTAL DOLLAR SUPPORT TO WORKLOAD BY
KIND OF WORKLOAD
- RATIO OF TOTAL DOLLAR SUPPORT TO THE NUMBER
OF BEDS¹⁰

The final subcategory of organizational measures and indicators is funding. Variables measured in this subcategory describe the way funds are distributed in the facility or system.

Depending on the facility or system in question, funding may be discussed in many different ways. The first two items on this chart suggest examining total annual funding of research programs and pilot or experimental programs. The next three concern the proportion of total funds used for each kind of specialized unit, personnel category, and major equipment. The last two measures relate funding to kinds of workload and to the number of beds.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

PROFESSIONAL ACTIVITIES, FACILITY
MEASURES AND INDICATORS

- JCAH ACCREDITATION STATUS
 - OF FACILITY
 - OF SPECIALIZED UNIT
- STATUS WITH RESPECT TO ACCREDITATION OR CERTIFICATION BY OTHER ORGANIZATIONS AND AGENCIES ²
- TOTAL NUMBER AND AVERAGE ATTENDANCE OF SCIENTIFIC AND PROFESSIONAL MEETINGS HELD AT FACILITY PER YEAR ³
- MEMBERSHIP IN HOSPITAL ASSOCIATIONS, LOCAL AND NATIONAL AND OTHER ORGANIZATIONS ³
- NUMBER OF PROFESSIONAL JOURNAL SUBSCRIPTIONS HELD BY FACILITY
- TOTAL MEDICAL LIBRARY HOLDINGS
- AFFILIATIONS WITH MEDICAL SCHOOLS ¹⁰

The first group of professional activities measures and indicators includes those of the facility or system as a whole. There is a wide variety of such activities that are possible. One of the more important ones is accreditation by hospital associations, federal, state and local organizations, etc. This is addressed by the first two measures shown. The next four are the size and number of professional meetings held at a facility, the facility's memberships in professional organizations, journal subscriptions, and its medical library holdings. Finally, we have included affiliations with medical schools. This is thought to be an indication of a facility's technical expertise.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

PROFESSIONAL ACTIVITIES, STAFF

MEASURES AND INDICATORS

- PERCENT OF PHYSICIANS BY SPECIALTY, TAKING REFRESHER OR POSTGRADUATE COURSES PER YEAR⁹
- AVERAGE NUMBER OF REFRESHER OR POSTGRADUATE COURSES COMPLETED DURING CAREER PER PHYSICIAN, BY SPECIALTY⁹
- AVERAGE NUMBER OF PROFESSIONAL ARTICLES WRITTEN BY STAFF MEMBERS THAT ARE PUBLISHED PER YEAR, BY PERSONNEL CATEGORY AND SPECIALTY⁹
- AVERAGE NUMBER OF CONFERENCE PAPERS PRESENTED BY STAFF MEMBERS PER YEAR, BY PERSONNEL CATEGORY AND SPECIALTY⁹
- AVERAGE NUMBER OF PROFESSIONAL MEETINGS ATTENDED PER STAFF MEMBER PER YEAR, BY PERSONNEL CATEGORY AND SPECIALTY⁹
- PERCENT OF PROFESSIONAL STAFF MEMBERS, BY PERSONNEL CATEGORY AND SPECIALTY, WHO ARE PARTICIPATING IN RESEARCH PROJECTS⁹

CONTINUED p. 110

This chart lists measures and indicators of staff professional activities. These items are thought to reflect the quality of the medical and nonmedical staff, and thus to impact the quality of health care. The first two deal with pursuit of postgraduate training. The third and fourth are numbers of professional articles and papers by members of the staff. The last two concern attendance at professional meetings and participation in research projects.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE:

PROFESSIONAL ACTIVITIES, STAFF (CONT.)

MEASURES AND INDICATORS

- AVERAGE NUMBER OF PERSONAL SUBSCRIPTIONS TO SCIENTIFIC AND PROFESSIONAL JOURNALS PER PHYSICIAN, BY PHYSICIAN SPECIALTY⁹
- AVERAGE NUMBER OF SCIENTIFIC AND PROFESSIONAL JOURNALS REVIEWED REGULARLY PER PHYSICIAN, BY PHYSICIAN SPECIALTY⁹
- AVERAGE NUMBER OF SCIENTIFIC AND PROFESSIONAL JOURNAL ARTICLES READ IN DETAIL PER PHYSICIAN PER MONTH, BY PHYSICIAN SPECIALTY⁹
- AVERAGE NUMBER OF FORMAL OR INFORMAL PROFESSIONAL CONSULTATIONS FOR WHICH STAFF PHYSICIANS ARE CALLED PER MONTH, PER PHYSICIAN BY SPECIALTY⁹
- PERCENT OF PATIENTS AT FACILITY FOR WHICH PROFESSIONAL CONSULTATIONS ARE REQUESTED, BY SPECIALTY AND BY INPATIENT AND OUTPATIENT⁹

This page lists additional measures and indicators of staff professional activities. The first three concern the extent to which staff members subscribe to professional journals and review or read in detail the articles they contain. The remaining two measures are the average number of formal or informal professional consultations for which staff physicians are called, and the percent of patients for which staff physicians request consultations.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE

OVERVIEW

- MOST COMMONLY USED MEASURES, E.G.
 - ASSESSMENT OF PHYSICIANS
 - ACCREDITATION OF HEALTH CARE INSTITUTIONS
 - LICENSURE OF HEALTH CARE INSTITUTIONS
- RELATION TO PROCESS AND OUTCOME
 - NOT FIRMLY ESTABLISHED
 - ATTEMPTS LIMITED
 - INCONCLUSIVE RESULTS IN RELATING STRUCTURE TO PROCESS
 - COMPLICATED BY LARGE NUMBERS OF PARAMETERS AND MEASURES
- DATA EASILY ACQUIRED
 - MATTER OF RECORD
 - DIRECT INSPECTION

CONTINUED p. 114

Structural measures of quality are the most commonly used means to assess quality of care. They describe properties of facilities, equipment, organization, financing, staffing, and professional activities. Physician capability has frequently been assessed in terms of the medical school attended, standing in medical school class, location and duration of postgraduate training, specialty board certification, and continuing education. Structural measures are used in specifications for the assessment, certification, or accreditation of health care institutions. Hospitals must satisfy a number of detailed structural requirements. These range from building, fire, electrical, and mechanical codes that are prerequisites for legal permission to operate to the detailed requirements for JCAH accreditation. These latter include procedures in assigning medical staff privileges, operating internal quality review committees, and preparing disaster and emergency plans. Nursing homes must also meet code and accreditation requirements.

In using structural measures and indicators to assess health care quality one assumes that "qualified physicians in well equipped and organized facilities will provide high quality health care." There has been relatively little effort to date to validate structural variables as indicators of quality by investigating their relationship to outcomes or processes of care. What has been done is inconclusive. Several studies have attempted to measure the relation between structural variables and the process of care provided by a physician. They found little relation between physician performance and structure variables. In general, such attempts are limited in the same ways as attempts to relate process and outcome. There is a lack of consensus on measures and standards for outcomes and processes as well as an inability to apply them. Further, it would be quite difficult to identify a specific set of structural measures small enough to be practically useful and at the same time adequate to predict outcome or process variables. If such a set were identified, it would undoubtedly be large.

Data on structural measures are generally easy to acquire. In many cases, they are a matter of record, e.g., physician training and certification. In other cases, data can be acquired by direct inspection, e.g., compliance with codes.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE

OVERVIEW (CONT.)

- STANDARDS HIGHLY OBJECTIVE
 - CLEARLY STATED
 - READILY ASSESSED
- OTHER LIMITATIONS
 - ATTRIBUTING CAUSE
 - RELATIVELY INFREQUENT
 - DEPENDENT ON MEASURE AND INNOVATION
- OVERALL FEASIBILITY
 - RELATIVELY HIGH

Standards for structural measures are highly objective and can be stated simply and clearly, although agreeing on the appropriate value may not be easy. Because they can be simply stated, it is usually quite clear when they have been met.

As in evaluating quality in terms of outcomes and processes of care, a causal relationship between structural variables and an innovation may be difficult to establish. The level of difficulty depends on both the innovation and the variable. For example, the effect of purchasing an X-ray machine on the number of X-ray machines is apparent. However, the effect of introducing a computerized axial tomography (CAT) scanner on the number of board-certified radiologists may be difficult to establish. Accounting for effects of changes (other than the innovation) during the course of an evaluation is a further limitation.

In summary, there are many structural measures; they are, in general, highly objective, and determining their values is usually easy. Further, the relationship between a structural variable and an innovation is often apparent making the feasibility of using them in evaluating an innovation relatively high. Unfortunately, the usefulness of such measurements in drawing references about care quality is unclear.

QUALITY OF HEALTH CARE EVALUATED IN TERMS OF STRUCTURE

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6. AVAILABILITY

AVAILABILITY OF HEALTH CARE

AVAILABILITY OF HEALTH CARE

DEFINITION

THE PRESENCE, BY KIND AND AMOUNT,
OF RESOURCES THAT ARE ORGANIZED
AND READY TO PROVIDE HEALTH CARE

The literature does not clearly differentiate between availability and accessibility of health care. For the purpose of this paper, the two terms are defined in a way that makes them separate but closely related.

Availability of health care is the presence, by kind and amount, of resources that are organized and ready to provide care. The requirement that resources be organized and ready means that in some cases care is available only to a specific population or at specified times. That requirement also means organized and ready in a manner acceptable to the medical community.

If resources exist such that care will be provided to persons presenting for care at the specified times with the proper entitlement or resources (money for fees, insurance coverage, etc.), it is considered available. A complete description of health care availability must specify the location of the population to receive care and whether they have the necessary entitlement and resources. Availability is not concerned with how easy it is for this population to present for care or to comply with the care prescribed. Under the definition given here, such considerations affect only accessibility of care available.

AVAILABILITY OF HEALTH CARE

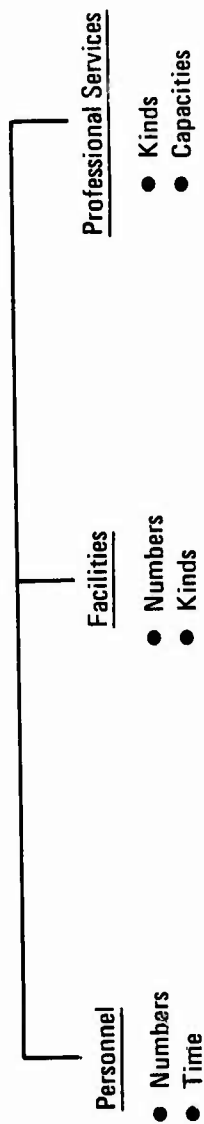
RATIONALE

- MOST FUNDAMENTAL ATTRIBUTE OF CARE
- REQUIRED BY MHCS OBJECTIVES

Availability is the most fundamental attribute of health care in the sense that all others presuppose it.

The objectives of the MHCS require that trained manpower and other health care resources be available to support military contingency plans and to provide comprehensive health care services for the eligible population. In addition, the comprehensiveness of services available determines how full a spectrum of medical diagnostic problems the system can support. It thus affects the ability to maintain a staff of high-quality health care professionals.

SUBAREAS OF EFFECTIVENESS AND
MAJOR KINDS OF MEASURES AND INDICATORS
FOR AVAILABILITY OF HEALTH CARE



We will discuss measures and indicators for three subareas of health care availability specified in terms of kinds of care resources. They are: availability of personnel, availability of facilities, and availability of professional services. The chart shows the main kinds of measures and indicators in each subarea.

AVAILABILITY OF HEALTH CARE: PERSONNEL

MEASURES AND INDICATORS 5,9

- NUMBER OF FULL-TIME EQUIVALENT (FTE) PERSONNEL
- RATIOS OF FTE PERSONNEL TO ELIGIBLE POPULATION 1,3
- AVERAGE NUMBER OF STAFF ON DUTY, BY
 - TIME OF DAY
 - DAY OF WEEK
- AVERAGE TIME AVAILABLE PER CARE PROVIDER FOR DIRECT PROVIDER-PATIENT CONTACT 2,4,6,8,11
- AVERAGE NUMBER OF PATIENT-PROVIDER CONTACTS, ACCEPTABLE TO THE HEALTH CARE COMMUNITY, THAT CAN BE SCHEDULED PER DAY 3
- RATIO OF NUMBER OF PATIENT-PROVIDER CONTACTS THAT CAN BE SCHEDULED ANNUALLY TO ELIGIBLE POPULATION
- PERCENT OF CARE PROVIDER TIME ALLOCATED TO 2,4,6,8,11
 - DIRECT CARE ACTIVITIES
 - INDIRECT CARE ACTIVITIES
 - OTHER

AS APPLICABLE, BY

- PERSONNEL CATEGORY
 - PHYSICIANS
 - THERAPISTS
 - NURSES
 - TECHNICIANS
 - SUPPORT
 - OTHERS
- SPECIALTY
- SYSTEMWIDE
- ARMY/NAVY/AF
- DEFENSE HEALTH CARE REGION
- MTF (OR ITS SERVICE AREA)

The measures and indicators on this chart concern availability of personnel. Generally, they address numbers of personnel and the way their time is assigned to provide services. The second and sixth measures are ratios of personnel measures to eligible population. Such ratios are needed as an indication of the adequacy of resources available.

As specified on the right of the chart, the measures and indicators are to be evaluated separately for physicians, therapists, nurses, technicians, and other support personnel (such as those performing clerical or housekeeping duties) when this is appropriate. Other personnel categories could be identified as needed. For professional personnel the measures are also to be evaluated separately by specialty. Each item listed can be applied at the Medical Treatment Facility (MTF) level. The first two could also be applied systemwide and for each military department and defense health care region.

AVAILABILITY OF HEALTH CARE: FACILITIES

MEASURES AND INDICATORS

- NUMBER OF MEDICAL TREATMENT FACILITIES
- NUMBER OF NURSING UNITS, BY CLINICAL SERVICE AND NUMBER OF OPERATING BEDS
- NUMBER OF SPECIALIZED UNITS, BY KIND OF UNIT AND SIZE
- AMOUNT OF FLOOR SPACE IN USE FOR
 - INPATIENT UNITS
 - OUTPATIENT CLINICS
 - ANCILLARY SERVICES
 - ADMINISTRATIVE FUNCTIONS
- RATIO OF NUMBER OF OPERATING BEDS, BY CLINICAL SERVICE, TO ELIGIBLE POPULATION^{1,3}
- RATIO OF SPECIALIZED UNIT CAPACITY BY KIND OF UNIT TO ELIGIBLE POPULATION³
- RATIO TO ELIGIBLE POPULATION OF AMOUNT OF FLOOR SPACE IN USE FOR
 - INPATIENT UNITS
 - OUTPATIENT CLINICS
 - ANCILLARY SERVICES

BY

• SYSTEMWIDE

• ARMY/NAVY/AF

• DEFENSE HEALTH CARE
REGION

• MTF

The second subarea of availability is facilities. It includes measures of the numbers and types of buildings, floor space usage, as well as sizes and types of nursing and specialized units present. The last three are ratios included as indicators of the adequacy of these resources.

The measures listed, except the first, are applicable at the MTF level as well as system-wide, for each military department and defense health care region.

AVAILABILITY OF HEALTH CARE: PROFESSIONAL SERVICES
7
MEASURES AND INDICATORS

- FOR EACH KIND OF PROFESSIONAL SERVICE,* NUMBER OF MTFs THAT OFFER THE SERVICE, BY SIZE OF MTF AND MILITARY DEPARTMENT, AND DEFENSE CARE REGION
- HOURS AND DAYS OF OPERATION 10
- AVERAGE NUMBER OF PERSONNEL ON DUTY, BY KIND OF PERSONNEL, TIME OF DAY, AND DAY OF WEEK 10
- NUMBER OF UNITS OR COMPLEMENTS OF MAJOR EQUIPMENT, BY SIZE AND KIND, FOR THE PROFESSIONAL SERVICE 10
- AMOUNT OF FLOOR SPACE USED FOR PROFESSIONAL SERVICE 10
- OPERATIONAL CAPACITY OF THE PROFESSIONAL SERVICE, BY TIME OF DAY AND DAY OF WEEK 10
- FOR EACH PROFESSIONAL SERVICE, THE RATIO OR AVERAGE OPERATIONAL CAPACITY TO ELIGIBLE POPULATION
 - SYSTEMWIDE
 - FOR EACH MILITARY DEPARTMENT
 - FOR EACH DEFENSE HEALTH CARE REGION
 - BY MTF, TIME OF DAY, AND DAY OF WEEK

APPLICABLE, BY

• MTF

• KIND OF PROFESSIONAL SERVICE*

* KINDS OF PROFESSIONAL SERVICE INCLUDE ALL CLINICAL SPECIALTIES (BY INPATIENT AND OUTPATIENT), ALL SPECIALIZED SERVICES SUCH AS INTENSIVE CARE UNITS, DRUG TREATMENT PROGRAMS, AND OTHER THERAPY UNITS, AS WELL AS PHARMACY, FAMILY PLANNING, SOCIAL WORK, AND OTHERS.

Availability of professional services is the third subarea of availability. As the footnote on the chart explains, professional services include all clinical specialties, specialized service units, ancillary services, and support services. The list given in the note is representative though not necessarily exhaustive. Measures and indicators describe the kinds and amounts of services offered. The last two are concerned with operational capacity of a service; that is, the number of patients or procedures that can be processed per unit time at a given level of quality. This is based on factors such as numbers and kinds of personnel, equipment, space, and supplies available for the service, the time required to provide a unit of service, and standards of quality.

The first and last measures are applicable system-wide and for each military department and defense health care region. All are applicable at the MTF level.

AVAILABILITY OF HEALTH CARE

OVERVIEW

- THREE PERSPECTIVES: SYSTEMWIDE, REGIONAL, AND LOCAL
 - MEASURES ESSENTIALLY THE SAME
 - DATA REQUIREMENTS DIFFER
 - SYSTEMWIDE MEASUREMENTS HIGHLY AGGREGATED
 - LOCAL MEASUREMENTS RELATE RESOURCES TO A SPECIFIC CATCHMENT POPULATION
- MEASURES IN LITERATURE
 - APPEAR FREQUENTLY
 - TYPICALLY MEASURE QUANTITIES OF RESOURCES PER CAPITA
 - PERSONNEL, EQUIPMENT, FACILITIES
 - WIDELY ACCEPTED
 - ONLY CONTROVERSY: VALUES AS STANDARDS
- MOST COMPREHENSIVE MEASURES: OPERATIONAL CAPACITY
 - E.G., AVERAGE NUMBER OF PATIENTS THAT CAN BE SEEN PER UNIT TIME, FOR A SPECIFIED PATIENT MIX
 - REQUIRES DETAILED INFORMATION ON THE FACILITY AND ITS OPERATION
 - RESOURCES PRESENT
 - KINDS
 - NUMBERS
 - CAPABILITIES
 - TIMES
 - RESOURCE INTERACTION

CONTINUED p. 134

Health care availability to the military community can be viewed from systemwide, regional, or local perspectives. These views involve essentially the same measures but impose different data collection requirements. Systemwide measures are used to assess overall supplies of health resources. These highly aggregated measures do not reflect the distribution of resources and population. Local and regional measures assess the portions of those health resources available to specific catchment populations. Detailed measurements are not needed or justified to evaluate systemwide availability; measurements required at the local and regional levels are more detailed.

Measures of availability appear frequently in the literature. They typically measure quantities of resources (personnel, equipment, facilities) per capita. These kinds of measures are widely accepted. The only controversy related to them concerns values to be used as standards.

The most comprehensive measures are those of the operational capacity of specific services. For example, the average number of patients that can be seen in a general practice clinic per day at a given level of care and a given patient mix. The measures of the level of care might be the amount of provider time per patient seen. Specific definition and use of these measures requires detailed information about the facility and its operation including the kinds, numbers, and capabilities of resources present; when they are present; and how they interact in providing health care.

AVAILABILITY OF HEALTH CARE

OVERVIEW (CONT.)

- AVAILABILITY OF STAFF TIME FOR PATIENT CARE
 - RELATED TO PRODUCTIVITY IN NON-PATIENT-RELATED TASKS
 - HAWTHORNE EFFECT IN STUDIES
 - LARGE SAMPLES FOR STUDIES
- DATA
 - MUCH EXISTS, ROUTINELY COLLECTED
 - VARIES
 - IN DETAIL, WITH ORGANIZATIONAL LEVEL
 - IN KIND, AMONG FACILITIES
 - USUALLY REFLECTS ASSIGNED RESOURCES
 - POPULATION
 - WELL DEFINED SYSTEMWIDE
 - FACILITY CATCHMENT UNCERTAIN

Another measure of availability is staff time available for patient-related activities, which is closely associated with productivity in tasks that are not patient-related. Studies of the allocation of staff time, however, depend upon staff cooperation and are probably especially susceptible to the Hawthorne Effect (altering normal work patterns because one is being observed). In addition, fairly large samples are often needed since individuals can allocate their time so differently.

Data routinely collected or contained in existing records can often be used for measures of availability. At higher organizational levels data are less detailed than at local levels, and local data vary in types and detail. Existing information usually represents only assigned or "full-strength" resources and does not reflect variations in actual availability due to personnel absences or inoperable equipment. Data are not readily available on the population served except for the system as a whole. The size and composition of the catchment population of an MTF is uncertain for several reasons. First, those eligible may receive treatment at any MTF; second, catchment areas are hard to define when two or more MTFs are relatively close to one another, as in the Washington, D.C. area; and finally, the distribution of retired personnel and their dependents among catchment areas is currently unknown.

AVAILABILITY OF HEALTH CARE

OVERVIEW (CONT.)

- OVERALL FEASIBILITY IS GENERALLY HIGH
 - FOR COMPREHENSIVE MEASURES
 - COSTLY
 - TIME CONSUMING
 - FOR ALLOCATION OF TIME, DEPENDENT ON DETAIL
 - LIMITATIONS FOR USE IN EVALUATION ARE LESS SIGNIFICANT THAN ELSEWHERE

The overall feasibility of measuring availability is high. Most measures involve information that is known and accessible and are thus inexpensive to apply. The comprehensive operational capacity measures, however, require costly, time-consuming data collection and analysis. Measurements of the allocation of staff time may be feasible and relatively inexpensive depending on the detail required. For example, the time physicians are in the MTF per day is not too difficult to measure, while the percent of time they spend in each activity would be difficult to measure. In the latter case, the knowledge gained may not justify the cost.

Limitations to evaluating an innovation have been discussed previously. Primarily, they are establishing the innovation as a cause of observed changes separating effects of the innovation from those of other changes. Measures of availability are similar to those for evaluating quality in terms of structure. Overcoming them depends on the specific measure and the innovation being evaluated. Though difficult, the task is generally easier than in many other areas of effectiveness.

AVAILABILITY OF HEALTH CARE

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7. ACCESSIBILITY

ACCESSIBILITY OF HEALTH CARE

ACCESSIBILITY OF HEALTH CARE

DEFINITION

THE EXTENT TO WHICH AND THE EASE WITH
WHICH A PERSON CAN OBTAIN HEALTH
CARE SERVICES THAT ARE AVAILABLE

Accessibility of health care is the extent to which and the ease with which a person can obtain health care services that are available. This definition applies to the eligible population as well as to persons who may receive care in an emergency but who are not members of the eligible population.

The extent to which a person receives services depends on his willingness and ability to enter the health care system in the face of barriers he perceives (real or imagined) and the extent of his need as determined by a physician.

The ease with which health care can be obtained is inversely related to the difficulty patients encounter in seeking care. It may thus be evaluated in terms of barriers to obtaining care.

ACCESSIBILITY OF HEALTH CARE

RATIONALE

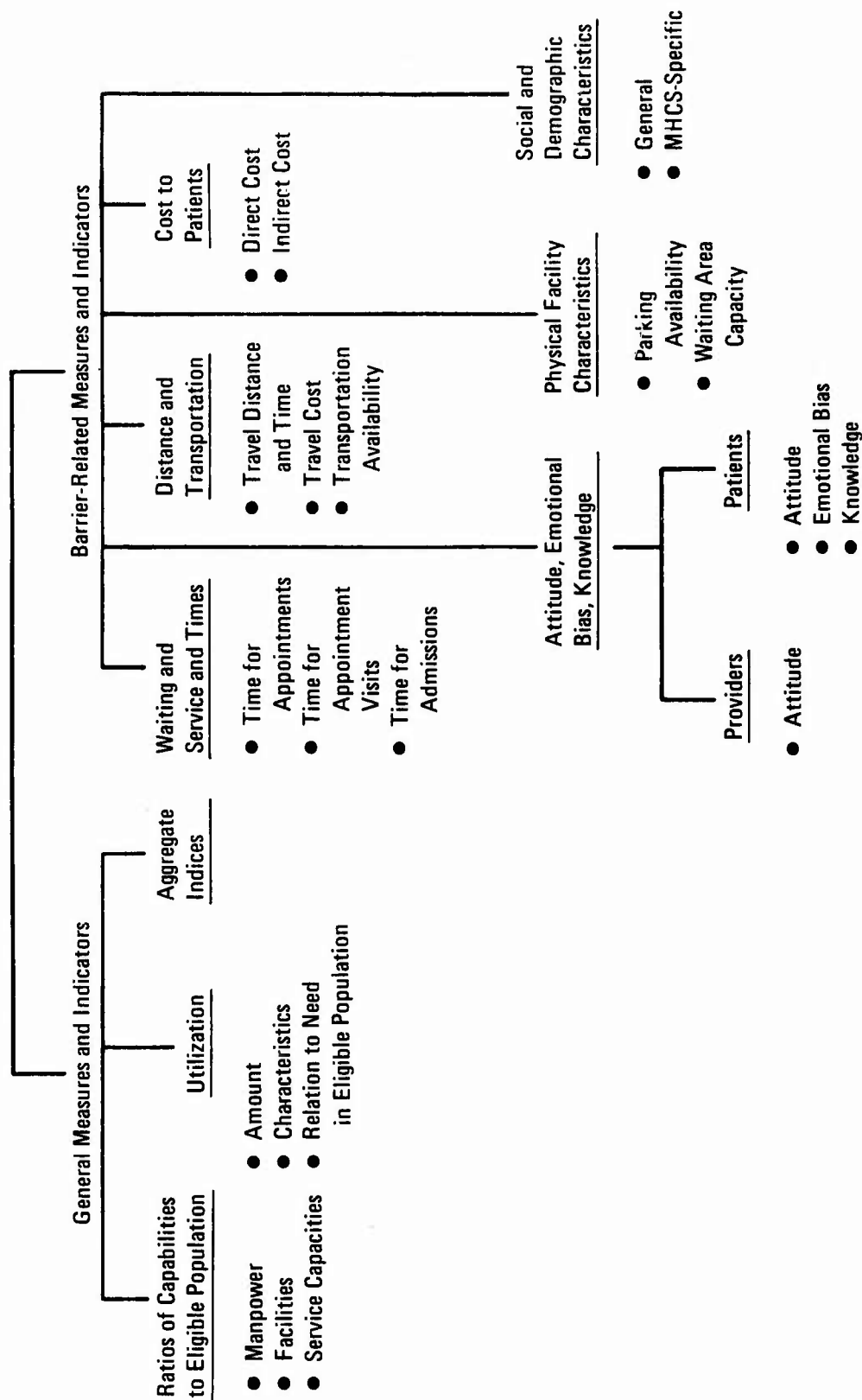
- TO BE EFFECTIVE, HEALTH CARE MUST BE ACCESSIBLE
- ACCESSIBILITY IS PART OF THE CONCEPT OF HEALTH CARE AS A RIGHT
- ACCESSIBILITY IS CLOSELY RELATED TO ACCEPTABILITY AND TO PATIENT BEHAVIOR

To serve a community effectively a health care system must be accessible to that community. Availability of adequate health care resources for a population does not guarantee that all members of the population will be able to obtain the health care services they need.

The view that each person in society has a right to the health care he needs implies a requirement for accessible care. The requirement is even stronger for a health care system explicitly charged with providing care to a specific population.

In addition, the extent of difficulty or inconvenience encountered in seeking care may affect the system's acceptability to the population, behavioral outcomes such as compliance, and where a person seeks care.

CATEGORIES, SUBCATEGORIES, AND KINDS OF MEASURES AND INDICATORS FOR ACCESSIBILITY



Measures and indicators of accessibility can be separated into two categories: General and barrier-related. The general category contains measures and indicators that reflect the accessibility of health services to the eligible population but do not identify specific factors that limit accessibility. Such factors are addressed by the barrier-related measures and indicators.

The general measures and indicators are divided into three major subcategories. The first is ratios of manpower, facilities and service capacities to eligible population. These ratios provide an indication of how much eligible members will have to compete for care.

The second subcategory contains measures of rates of utilization of services. The measures in the last subcategory, aggregate indices, are the results of attempts to generate a single value to represent accessibility.

We have identified six main kinds of barriers that affect a person's ability to obtain health care services. They are shown on this diagram as the six subcategories of barrier-related measures and indicators. These barriers include physical, psychological, economic, and social factors.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: GENERAL

RATIOS OF MANPOWER, FACILITIES, AND SERVICE CAPACITIES TO ELIGIBLE POPULATION 4,11

- RATIO OF NUMBER OF FTE PERSONNEL, BY PERSONNEL CATEGORY AND SPECIALTY TO ELIGIBLE POPULATION

- RATIO OF NUMBER OF OPERATING BEDS, BY CLINICAL SERVICE TO ELIGIBLE POPULATION

- RATIO OF SPECIALIZED UNIT CAPACITY, BY KIND OF UNIT TO ELIGIBLE POPULATION

- RATIO TO ELIGIBLE POPULATION OF AMOUNT OF FLOOR SPACE IN USE FOR:

- INPATIENT UNITS
- OUTPATIENT CLINICS
- ANCILLARY SERVICES

- FOR EACH KIND OF PROFESSIONAL SERVICE, * RATIO OF AVERAGE OPERATIONAL CAPACITY TO ELIGIBLE POPULATION (BY TIME OF DAY AND DAY OF WEEK FOR INDIVIDUAL MTF)

BY

- SYSTEMWIDE
- ARMY/NAVY/AF
- DEFENSE HEALTH CARE REGION
- MTF

* KINDS OF PROFESSIONAL SERVICE INCLUDE ALL CLINICAL SPECIALTIES (BY INPATIENT AND OUTPATIENT), ALL SPECIALIZED SERVICES SUCH AS ICUS, DRUG TREATMENT PROGRAMS, AND OTHER THERAPY UNITS, AS WELL AS PHARMACY, FAMILY PLANNING, SOCIAL WORK, AND OTHERS.

This chart lists five ratios that indicate health care accessibility. The denominator in each case is the appropriate segment of the eligible population. The ratios can be applied systemwide, and by military department, defense health care region, and MTF. This requires that the eligible population at each level can be explicitly identified. These ratios may also be used in studying the adequacy of the resources available and are thus also included among the measures and indicators of the availability of care (see "Availability of Health Care" in this report).

The numerator of the first ratio measures manpower, those of the next three measure facilities, and that of the last measures professional service capacity. The manpower measure of the first ratio is the number of FTE personnel by personnel category. The personnel categories of interest are physicians, therapists, registered nurses, technicians, licensed practical nurses, nurses aides, corpsmen, and other support personnel. Physicians, therapists, and nurses may be further separated by specialties.

The measures of facilities are beds by clinical service (medical, surgical, psychiatric, pediatric, etc.), specialized unit capacities by kind of unit (general intensive care, cardiac intensive care, respiratory care, etc.), and floor space identified by type of use (inpatient, outpatient, and ancillary services).

The measure of service capacity for each individually identifiable clinic or other professional service offered, is the operational capacity of the service, (i.e., the number of patients or procedures that can be processed per unit time at a given level of quality).

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: GENERAL

RATIOS OF MANPOWER, FACILITIES, AND SERVICE CAPACITIES TO THE ELIGIBLE POPULATION

OVERVIEW

● EASIEST TO APPLY OF GENERAL MEASURES AND INDICATORS

- DATA OBTAINABLE
- EXPERIENCE IN LITERATURE

● LIMITATIONS

- DEFINITION OF LOCAL CATCHMENT POPULATIONS
- LACK OF STANDARDS
- POPULATION-SPECIFIC VARIATIONS

● OVERALL FEASIBILITY

- HIGH FOR APPLICATION
- SOMEWHAT LOWER FOR ADEQUATE INTERPRETATION

Ratios of amounts of health care resources to the size of the eligible population are probably the easiest to apply of the general accessibility measures and indicators. Most data needed to apply them are easy to obtain and have been discussed in the preceding section of this report, "Availability of Health Care." As that discussion points out, the only major limitation in obtaining these data is the lack of clearly identified catchment populations at the local level. These ratios are often used in health services studies. Thus, there is considerable experience to guide other researchers who would use the ratios.

The only significant controversy associated with these ratios concerns standards for applying them. One reason that standards are not well defined is that the ratios are subject to considerable population-specific variation. For example, one would not expect the same number of pediatricians in relation to total population in a retirement community as in an area with many young families. Such variations must be identified and evaluated in any use of these ratios.

The overall feasibility of applying these measures is quite high since the data are generally easy to obtain. Interpretation of the results is somewhat less promising because of population-specific variations and the lack of accepted standards. Use of the ratios to evaluate the impact of an innovation introduces the task of establishing the innovation as the cause of an observed change. On the other hand, the lack of standards is probably less significant for this kind of evaluation.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: GENERAL (CONT.)

UTILIZATION 32,5,28,21

- | | |
|---|---|
| <ul style="list-style-type: none"> ● RATIO OF NUMBER OF OUTPATIENT VISITS, BY CLINIC TO ELIGIBLE POPULATION ⁴ ● RATIO OF NUMBER OF ADMISSIONS TO ELIGIBLE POPULATION, BY KIND OF NURSING OR SPECIALIZED UNIT (E.G., MEDICAL, SURGICAL, ICU, ETC.) ⁴ ● RATIO OF TOTAL EMERGENCY DEPARTMENT VISITS, BY DAY OF WEEK, TO ELIGIBLE POPULATION ● RATE OF "NO SHOWS" FOR APPOINTMENTS ● RATE OF APPOINTMENT CANCELLATIONS | <p>BY</p> <ul style="list-style-type: none"> ● SYSTEMWIDE ● ARMY/NAVY/AF ● DEFENSE HEALTH CARE REGION ● MTF |
|---|---|

The indicators listed here are rates of some aspect of utilization of health services. The first three are ratios of outpatient visits, admissions, and emergency department visits to the eligible population. Numbers of emergency department visits must be interpreted carefully since policies vary among institutions. For example, in some MTFs all walk-in outpatients must go to the emergency department while in other MTFs such patients are seen in clinics. The last two indicators are rates of "non-utilization."

Any of these measures could be assessed above the individual facility level, but this is probably useful only for the first two.

ACCESSIBILITY OF HEALTH CARE
MEASURES AND INDICATORS: GENERAL

UTILIZATION (CONT.)

- AVERAGE NUMBER OF HEALTH CARE SYSTEM
ENCOUNTERS PER PERSON ELIGIBLE PER SPECIFIED
TIME PERIOD. 4,11
- PERCENT OF ELIGIBLE POPULATION WHO HAVE ONE OR
MORE HEALTH CARE SYSTEM ENCOUNTERS PER SPECIFIED
TIME PERIOD. 4,11
- PERCENT OF POPULATION HAVING, PER SPECIFIED TIME
PERIOD:
 - NO ENCOUNTERS
 - 1 ENCOUNTER
 - 2 - 4 ENCOUNTERS
 - 5 - 7 ENCOUNTERS
 - 8 - 10 ENCOUNTERS
 - 11 OR MORE ENCOUNTERS 4,11

BY

- OUTPATIENT VISITS
- INPATIENT STAYS

- RATIOS OF OUTPATIENT VISITS WITH A PHYSICIAN TO RE-
STRICTED ACTIVITY DAYS AND TO BED DISABILITY DAYS 4,25
OF THE ELIGIBLE POPULATION FOR GIVEN TIME PERIOD.

CONTINUED p. 156

The first three items on this chart measure per capita utilization of health services in different ways. The first measures average utilization while the second and third deal with the distribution of encounters among the eligible population. All of these would be evaluated separately for outpatient visits and inpatient stays.

The last indicator listed relates the amount of perceived impairment to actual demand.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: GENERAL (CONT.)

UTILIZATION (CONT.)

- PERCENT OF TOTAL OUTPATIENT VISITS PER DAY THAT ARE
"NEW PATIENT" VISITS
- AVERAGE NUMBER OF DIFFERENT PROVIDERS SEEN FOR RESOLUTION
OF AN EPISODE OF ILLNESS OR INJURY³
- AVERAGE NUMBER OF EMERGENCY DEPARTMENT VISITS PER DAY, BY
 - TIME OF DAY
 - DAY OF WEEK
 - KIND OF VISIT (EMERGENCY, URGENT, NONURGENT
UNAVOIDABLE, NONURGENT AVOIDABLE)
- RATIO OF EMERGENCY DEPARTMENT VISITS TO TOTAL CLINIC VISITS,
BY DAY OF WEEK^{36,43}
- RATIO OF PREVENTIVE TO ILLNESS-RELATED OUTPATIENT VISITS³

The measures on this page assess characteristics of health care utilization that are thought to be related to accessibility. The first measures the daily rate at which new patients enter the system. The next is a measure of continuity of care, the number of care providers a patient usually sees to have a health problem resolved. The third assesses utilization of the emergency department while the fourth compares emergency department visits to normal clinic visits. As noted previously, emergency department utilization must be evaluated carefully because department policies vary among institutions. The last indicator is the ratio of preventive visits (checkups and immunizations) to illness-related visits (curative or followup care).

ACCESSIBILITY OF HEALTH CARE
MEASURES AND INDICATORS: GENERAL

UTILIZATION

OVERVIEW

- INDICATOR
 - GENERALLY ACCEPTED
 - POSITIVELY CORRELATED
 - EXACT RELATIONSHIP SITUATION DEPENDENT
- MOST FREQUENT MEASURE: NUMBER OF ENCOUNTERS, BY TYPE, PER CAPITA
 - NUMBER OF DIFFERENT PATIENTS NOT REFLECTED
 - DEFINITION OF CATCHMENT POPULATION DETERMINES ACCURACY
- OTHER MEASURE USED: ENCOUNTERS PER PATIENT
 - USED LESS FREQUENTLY
 - DATA LESS EASILY OBTAINED
 - SAMPLING RECORDS COSTLY AND LABORIOUS
 - ALTERNATIVE IS PATIENT SURVEY
 - ALSO COSTLY
 - UNCERTAINTY OF SELF-REPORTING
- BOTH NEEDED TO BE COMPREHENSIVE

CONTINUED p. 160

Utilization of health care services is a useful and generally accepted indicator of accessibility. Utilization and accessibility are generally positively correlated, but the relationship between the two is highly situation dependent.

The measure most frequently used is the number of encounters per capita by kind of service. The primary advantage of this measure is that data on numbers of encounters are routinely recorded. However, this measure does not indicate the number of different patients who use the services. This is an important shortcoming of the measure for studies of accessibility because these studies are concerned with what proportion of the population can obtain services. Further, any per capita measures will be uncertain when the catchment population is not clearly identified. This is the case for many local military facilities. The measure is only as accurate as the estimate of the population served.

Another utilization measure is encounters per patient. It is not as frequently used as encounters per capita, primarily because the data are less easily obtained. Determining numbers of encounters per patient usually requires sampling medical records, a laborious and costly process unless records are automated. An alternative method is to survey patients, but this too is costly. In addition, there are numerous limitations to the use of surveys as discussed in other sections of this report. A particularly relevant one here is that self-reported data are subject to considerable uncertainty.

Both of these measures are needed to obtain a description of utilization by the eligible population that is fairly comprehensive. Unless both can be evaluated, a study of accessibility will be limited.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: GENERAL

UTILIZATION

OVERVIEW (CONT.)

- NON-UTILIZATION CAN BE VALUABLE INDICATOR
 - ONLY MEASURES: NATIONAL INTERVIEW SURVEY
 - RATIOS OF USE TO NEED (PATIENT PERCEIVED)
 - E.G., THE NUMBER OF ENCOUNTERS WITH PHYSICIANS IN 2-WEEK PERIOD TO THE NUMBER OF RESTRICTED ACTIVITY DAYS IN THE SAME PERIOD
 - SPECIAL SURVEY PROBABLY NEEDED TO APPLY THEM
- MEASURES WILL REFLECT POPULATION-SPECIFIC PATTERNS
- OVERALL FEASIBILITY
 - ENCOUNTERS PER CAPITA FEASIBLE
 - CATCHMENT IDENTIFICATION
 - ENCOUNTERS PER PATIENT
 - EFFORT NORMALLY EXCESSIVE
 - NON-UTILIZATION MEASURES
 - COST OF PATIENT SURVEY
 - CATCHMENT POPULATION
 - ROLE OF INNOVATION IN PRODUCING CHANGE

Failure to use health care services when they are needed (non-utilization) may be caused by numerous factors only one of which is poor accessibility. Non-utilization can be a valuable indicator of accessibility, but it requires validation. The only measures for studying non-utilization that we found are those of the National Health Survey. These measures are ratios of use to need where need is in terms of patient-perceived impairment. One example is the ratio of the number of encounters with physicians in a 2-week period to the number of restricted activity days in the same period. If the catchment population is not clearly identified, results of using these measures will be uncertain. Unless the National Health Survey data can be used, evaluating non-utilization will require a special survey of the appropriate population. This is costly and entails numerous limitations as mentioned previously. A particular limitation is the difficulty of selecting a valid sample when the catchment population is not clearly identified. Unfortunately, the National Survey data are based on too broad a sample to be useful for most local evaluations. A special survey, if it were conducted, would have the additional benefit of providing information on the actual health care needs of the population.

All of these utilization measures will reflect population-specific utilization patterns that must be identified and accounted for in interpreting results.

In summary, measuring encounters per capita is highly feasible for clearly identified catchment populations. Estimates of uncertain catchment populations may allow the measure to be used with some prudence for these areas. Measuring encounters per patient is also feasible, but the data collection effort needed may normally be too great to be justifiable. Applying measures of non-utilization is feasible if the data of the National Health Survey can be used or if the cost of a patient survey is justified. The confidence that can be placed in the results will depend on the accuracy of the catchment population estimates. Using the measures to evaluate an innovation involves the additional difficulties of identifying other changes that affect the measures and of establishing the role of the innovation in producing an observed change.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: GENERAL (CONT.)

AGGREGATE INDICES:

- AVERAGE WEIGHTED SUM OF APPOINTMENT WAITING TIME,
TRAVEL TIME, AND PROCESSING TIME PER PATIENT AT
MTF³
- INDEX OF MEDICAL UNDERSERVICE (DEVELOPED TO MEET
CRITERIA OF 1973 HMO ACT) 23,45
- RATIO OF PHYSICIAN VISITS TO DISABILITY DAYS 2
- SYMPTOMS-RESPONSE RATIO 40

Each of the aggregate indices on this chart is derived from a different set of measures. The first index is based on the time required for a health care encounter. The average time to travel to a health care facility, to wait to see a provider, and to receive treatment are weighted by their relative importance and summed. This gives a single quantitative measure of accessibility.

The second index was developed in response to the Health Maintenance Organization Act (P.L. 93-222, 1973), which requires identification of medically underserved populations. In developing the index experts first assessed the relative scarcity of personal health services in different areas and identified factors they considered most useful as indicators of underservice. The index was then developed to predict this expert assessment using commonly reported statistics on the factors they identified as most useful indicators. Measurements used in this index include the number of practicing physicians per 1,000 population, the infant mortality rate, the percentage of the population over 65, and per capita expenditures on personal health care.

The third index on this chart is the ratio of physician visits to disability days for a specified population during a specified time period. Physician visits by individuals in the population who had at least one disability day would be included in the numerator.

The last index, the symptoms-response ratio, reflects the difference between the number of visits to a care provider in response to symptoms and the number of visits a panel of physicians consider appropriate for those symptoms. Symptoms such as coughing, weakness, headaches, diarrhea, weight loss, vomiting, and bleeding are used in this index.

ACCESSIBILITY OF HEALTH CARE
MEASURES AND INDICATORS: GENERAL

AGGREGATE INDICES

OVERVIEW

- SMALL NUMBER OF INDICES PROPOSED
- NO WIDESPREAD ACCEPTANCE
 - MANY FACTORS PERTINENT, NO LIMITED SET ACCEPTABLE
 - INDEX ASSIGNS RELATIVE IMPORTANCE
 - OFTEN POPULATION-SPECIFIC
- OVERALL FEASIBILITY
 - LOW
 - CAN APPLY IF DATA CAN BE COLLECTED
 - NEED FURTHER STUDY TO INTERPRET RESULTS
 - MAY IMPROVE, DEVELOPMENT IN PROGRESS

A small number of aggregate indices of accessibility have been proposed, but none of them have gained wide acceptance. A major reason for this is that accessibility is a complex, somewhat ill-defined concept, and the list of factors considered pertinent is long and constantly changing. No set of these factors that has been combined in an index has been thought sufficiently comprehensive to gain wide acceptance. Further, the way selected factors are combined in an index involves judging their relative weights of importance. Relative importance of the factors can vary for different populations. For example, cost may be more limiting than time for one group, while time is more important to another.

The feasibility of applying one of the existing indices depends on collecting the required data. The usefulness of the results would be doubtful without studying the validity of the index for the population to which it is applied. This makes the current overall feasibility low for using these indices to evaluate accessibility or changes in accessibility. Development of such indices, however, is currently in progress, spurred in part by the requirement for such an index to meet criteria of the 1973 HMO act. It may be that in time an index will be a particularly valuable approach for evaluating accessibility.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED

WAITING AND SERVICE TIMES 24, 39

- AVERAGE TIME REQUIRED TO MAKE AN OUTPATIENT APPOINTMENT BY TELEPHONE OR IN PERSON
- PROBABILITY THAT ALL APPOINTMENTS CAN BE CONVENIENTLY SCHEDULED ON THE SAME DAY
- AVERAGE TIME BETWEEN SCHEDULING AN OUTPATIENT APPOINTMENT OR ELECTIVE ADMISSION AND THE FIRST AVAILABLE APPOINTMENT/ADMISSION DATE, BY CLINIC OR KIND OF ADMISSION
- AVERAGE TIME BETWEEN AN OUTPATIENT APPOINTMENT OR ELECTIVE ADMISSION DATE REQUESTED BY A PATIENT AND THE SCHEDULED APPOINTMENT OR ADMISSION DATE, BY CLINIC OR KIND OF ADMISSION
- AVERAGE TIME BETWEEN SCHEDULING AN OUTPATIENT APPOINTMENT OR ELECTIVE ADMISSION AND THE SCHEDULED APPOINTMENT OR ADMISSION DATE, BY CLINIC OR KIND OF ADMISSION

CONTINUED p. 168

This chart lists measures of the potential patient's time associated with the appointment making process. Only the second is not a direct measure of time. Rather, it indicates convenience and efficiency in the use of time for the patient. The last three measures deal with both outpatient appointments and elective admissions and are closely related. They assess in different ways the time the system requires a person to wait for routine care.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED (CONT.)

WAITING AND SERVICE TIMES (CONT.)

- AVERAGE WAITING TIME AT FACILITY TO SEE A CARE PROVIDER OR
RECEIVE SERVICE FOR APPOINTMENT/WALK-IN PATIENTS AND FOR
FOLLOWUP/INITIAL VISIT, BY 17,35
 - CLINIC OR KIND OF SERVICE
 - KIND OF PROVIDER
 - TIME OF DAY
 - DAY OF WEEK
- AVERAGE LENGTH OF VISITS WITH CARE OR SERVICE PROVIDER FOR
APPOINTMENT/WALK-IN PATIENT AND FOR FOLLOWUP/INITIAL VISIT, BY 17,35
 - CLINIC OR KIND OF SERVICE
 - KIND OF PROVIDER
 - TIME OF DAY
 - DAY OF WEEK
- AVERAGE PATIENT WAITING TIME FOR INPATIENT ADMISSION PROCEDURES, BY
 - TIME OF DAY
 - DAY OF WEEK
 - KIND OF ADMISSION (NORMAL, PREADMISSION, EMERGENCY)

The first two measures on this chart are frequently used in studies of outpatient health care systems. The first is a measure of the time a patient waits to see a care provider or to receive a clinical service. The second is a measure of the time a patient spends with the care or service provider. Both measures are by the type of clinic or service, kind of provider, time of day, and day of the week. Visits are classified as appointment or walk-in and as followup or initial. The third measure applies only to inpatients, measuring the time they must wait for admission procedures. This includes waiting for administrative procedures as well as for such other activities as preparation of the room. There may be a number of distinct waiting periods in the admission process. These will probably vary by facility and will have to be identified for each particular study.

ACCESSIBILITY OF HEALTH CARE
MEASURES AND INDICATORS: BARRIER-RELATED
WAITING AND SERVICE TIMES

OVERVIEW

- FREQUENT STUDY SUBJECT
 - NUMEROUS STANDARD METHODOLOGIES
 - APPLICATIONS IN HEALTH CARE SETTING
- TIME IN NUMEROUS ACTIVITIES MUST BE MEASURED
 - SPECIFIC ACTIVITIES MEASURED DEPEND ON
 - SYSTEM COMPLEXITY
 - EVALUATION PURPOSE
 - NONE SPECIFIED AS BEST FOR ACCESSIBILITY
- EFFECT ON UTILIZATION NOT ESTABLISHED
- OVERALL FEASIBILITY
 - METHODS EXIST
 - WIDELY ACCEPTED AND APPLIED
 - LEVEL OF EFFORT CAN BE GREAT
 - COMPLEXITY OF SYSTEM
 - LEVEL OF DETAIL REQUIRED
 - ACCURACY REQUIRED
 - FOR EVALUATING INNOVATION
 - OTHER INFLUENCING FACTORS
 - CAUSALITY

Waiting and service times for various activities are a frequent study subject. There are numerous standard methodologies for conducting such studies, and most of them have been applied in a health care setting. Thus, considerable guidance is available for designing and conducting efforts in this area.

To adequately evaluate the delays or a change in the delays a patient encounters in a health care system, the time he spends in a number of different activities would have to be measured. The specific number and kinds of activities would depend on the complexity of the health care system as well as on the purpose of the evaluation.

Unfortunately, the literature provides little guidance in selecting a particular, most valuable set of waiting and service times to be measured in studying accessibility. While delays are a generally accepted aspect of accessibility, their actual effect on patient utilization has not been studied extensively. Such studies are complicated because each individual values his time differently, and the value varies with his situation. The extent to which anticipated delays will deter him from seeking care depends on his perceived need for care.

In summary, feasible methods exist for measuring waiting and service times. The primary limitation for a particular evaluation is the required effort to obtain measurements. This effort can be considerable depending on the complexity of the health care system, the number and detail of the waiting and service times to be measured, and the required accuracy of the measurements. In evaluating the impact of an innovation, factors other than the innovation that affect these times must be identified and assessed, and the role of the innovation in causing observed changes must be established.

ACCESSIBILITY OF HEALTH CARE:

MEASURES AND INDICATORS: BARRIER-RELATED (CONT.)

ATTITUDE, EMOTIONAL BIAS, AND KNOWLEDGE: PATIENTS

● SCORE ON SURVEY OF PATIENT SATISFACTION WITH THE FOLLOWING ASPECTS OF THE MTF AND THE MHCS 46

- CONVENIENCE
- COORDINATION OF SERVICES
- COSTS ASSOCIATED WITH OBTAINING CARE
- COURTESY OF STAFF
- INFORMATION PROVIDED ABOUT CONDITION
- QUALITY OF CARE

● DEGREE OF ALIENATION OF PATIENTS BY MHCS (SCORE ON ALIENATION SCALE) 13

● AVERAGE SCORE ON TEST OF KNOWLEDGE OF ELIGIBLE POPULATION'S KNOWLEDGE ABOUT THE HEALTH CARE SYSTEM 7

These measures and indicators of patients' attitudes, emotional bias, and knowledge all involve use of surveys or tests. The first assesses a patient's attitude in terms of specific aspects of health care delivery, while the second makes an overall assessment of alienation. The third measure tests patients' knowledge about the care available and how to obtain it.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED (CONT.)

ATTITUDE, EMOTIONAL BIAS, AND KNOWLEDGE: PROVIDERS

- SCORE ON SURVEY OF PRIMARY CARE PROVIDER ATTITUDES, PARTICULARLY
 - CONCERN FOR PATIENTS
 - VIEW OF HEALTH CARE PROFESSION
 - SATISFACTION WITH MTF
- SCORE ON SURVEY OF PRIMARY CARE PROVIDERS' PERCEPTIONS OF COWORKERS BEHAVIOR TOWARD PATIENTS

To assess the attitudes and behavior of primary care providers who interact directly with patients, two kinds of surveys might be used. The first is a survey of provider attitudes toward their jobs and toward patients. This is similar to surveys discussed in the section of this report on health care system acceptability to the staff. The second kind of survey assesses primary care providers' perceptions of their coworkers attitudes and behavior toward patients.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED
ATTITUDE, EMOTIONAL BIAS, AND KNOWLEDGE

OVERVIEW

- SURVEYS ONLY DIRECT APPROACH
 - MEASURES OF ATTITUDE
 - MEASURES OF KNOWLEDGE
- DISCUSSED IN SECTION ON ACCEPTABILITY TO PATIENTS
- ADAPTING EXISTING SURVEYS POSSIBLE
- OVERALL FEASIBILITY
 - HIGH, SUBJECT TO
 - VALIDITY AND RELIABILITY
 - COSTS

The only direct approach for measuring attitudes, emotional bias, and knowledge about the health care system is by means of surveys. A thorough discussion of such surveys is presented in the section of this report on the acceptability of health care. Surveys to assess patients' and primary care providers' attitudes, emotional bias, and knowledge as barriers to obtaining care may differ from acceptability surveys in some of the particular subjects investigated. The discussion of acceptability surveys is nevertheless applicable here. It is possible that in some cases existing, validated surveys could be adapted for studying accessibility with a partial saving of development and validation costs. The extent to which attitudes, emotional bias, and knowledge are barriers to obtaining care is affected by how the patient perceives his need for care. This must be considered in using such surveys to study accessibility.

In summary, the use of surveys is a feasible method for studying patients' attitudes and knowledge as barriers to obtaining health care subject to the limitations discussed in the section of this report on care acceptability. Those limitations include the validity and reliability of the instruments and the associated costs of development, validation, administration and followup. In evaluating the impact of an innovation an additional task is determining the role of the innovation in producing a change. This may be particularly difficult for changes in attitudes.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED (CONT.)

- DISTANCE AND TRANSPORTATION 1,10,12,29,38 8,22,42
- AVERAGE LINEAR DISTANCE, TRAVEL DISTANCE, AND TRAVEL TIME, FROM CENTERS OF POPULATION TO NEAREST MTF, WEIGHTED BY POPULATION SIZE 8,22,42
 - AVERAGE OF THE MEAN LINEAR DISTANCE, TRAVEL DISTANCE, AND TRAVEL TIME, FROM CENTERS OF POPULATION TO ALL MTFs IN THE AREA, WEIGHTED BY POPULATION SIZE 8,22,41,42
 - AVERAGE PATIENT TRAVEL COST PER VISIT, BY EMERGENCY OR ROUTINE VISIT
 - PERCENT OF THE ELIGIBLE POPULATION TO WHOM PUBLIC TRANSPORTATION IS AVAILABLE FOR TRAVEL TO MTF, BY KIND OF PUBLIC TRANSPORTATION⁷
 - FREQUENCY OF SERVICE AND HOURS OF OPERATION OF PUBLIC TRANSPORTATION SERVING MTF, BY KIND OF PUBLIC TRANSPORTATION⁷
 - RESPONSE TIME OF EMERGENCY TRANSPORTATION SERVICE, BY³⁷
 - TYPE OF EMERGENCY TRANSPORTATION
 - TIME OF DAY
 - DAY OF WEEK
 - NUMBER OF EMERGENCY TRANSPORTATION UNITS AVAILABLE, BY
 - TYPE OF EMERGENCY TRANSPORTATION
 - TIME OF DAY
 - DAY OF WEEK

These measures concern distance and transportation conditions that affect a person in seeking care. They are specific, quantitative, and tend to be relatively easy to evaluate. The first three address distance, time, and cost of travel to a health facility. The next two concern the availability and responsiveness of transportation services.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED

DISTANCE AND TRANSPORTATION

OVERVIEW

- MEASURES FREQUENTLY USED
 - FROM CENTERS OF POPULATION TO FACILITIES
 - AVERAGE DISTANCE
 - AVERAGE TRAVEL TIME
 - AVERAGE TRANSPORTATION COST
 - CENTERS OF POPULATION REQUIRE DEFINITION
 - DATA OBTAINABLE
- OTHER MEASURES IDENTIFIED
 - PUBLIC TRANSPORTATION
 - EMERGENCY TRANSPORTATION
 - SOME STRAIGHTFORWARD, OTHERS COMPLICATED
- MULTIPLE MEASURES REQUIRED
 - CHOICE IS SOMEWHAT LOCATION SPECIFIC

CONTINUED p. 182

Measures of distance and transportation difficulties indicate the effect of the geographic distribution of health care facilities on access to the health care. The measures most frequently used and cited in the literature are averages of distance traveled, of time required for travel, and of costs of travel between a population center and a health care facility. Use of such measures requires definition of population centers. This may be appropriate and relatively easy in studying, for example, a regional health care center or a facility that serves several rural communities. This will not generally be the case for metropolitan areas. Defining appropriate population centers is more complicated if the population served is only a relatively small portion of the population-at-large as in the case of the MHCS-eligible population. Data to apply these measures are easy to obtain once population centers have been defined.

Other measures concern the availability of public transportation and emergency transportation. Some are quite straightforward and easily used, such as hours of operation. Others, such as the proportion of the population to whom public transportation is available, require careful definition before they can be applied and would entail a complicated data collection effort.

A number of measures will normally be required to describe the distance and transportation difficulties encountered by the population of interest in a given evaluation. The specific measures selected will be somewhat dependent on the location studied. For example, it may be important to measure travel time as well as distance in an urban center but not in a rural area.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED

DISTANCE AND TRANSPORTATION (CONT.)

OVERVIEW (CONT.)

- SEPARATE STUDY TO DETERMINE IMPACT ON UTILIZATION
 - RESULTS IN LITERATURE CANNOT BE GENERALIZED
- OVERALL FEASIBILITY
 - HIGH, GIVEN WELL-DEFINED POPULATION CENTERS
 - ROLE OF INNOVATION AS CAUSE

These measures provide information only about the extent to which distance and transportation are potential obstacles to obtaining care. They do not reflect the effect these obstacles actually have on care utilization. For that purpose, a separate study would be required. Some study of the importance of travel distance and difficulty in determining utilization of health care has been done. It would rarely be possible, however, to extrapolate their results to another situation because the impact of these factors on utilization is highly specific to a given population.

In summary, measures of travel distance, time, and cost are widely accepted and applied. In general, they are quite easy to use though there are some limitations. In particular, population centers must be identified and defined, and some measures require clarification before they can be used. If information on actual impacts on utilization is required, a separate study will be needed. Finally, use of these measures in studying a particular innovation introduces the additional tasks of monitoring other changes and determining the role of the innovation in causing a change.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED (CONT.)

PHYSICAL FACILITY CHARACTERISTICS

- RATIO OF THE AVERAGE NUMBER OF OUTPATIENTS IN THE SYSTEM,
BY TIME OF DAY, TO THE NUMBER OF PATIENT PARKING SPACES
AVAILABLE
- RATIO OF THE AVERAGE NUMBER OF PERSONS WAITING, BY TIME
OF DAY AND DAY OF WEEK, TO THE NUMBER OF SEATS AVAILABLE,
FOR EACH WAITING AREA
- ENVIRONMENTAL CONDITIONS (IN APPROPRIATE UNITS)
 - NOISE LEVEL
 - ILLUMINATION LEVEL
 - OTHER
- SCORE ON SURVEY ABOUT CONVENIENCE AND ENVIRONMENT 27
 - PARKING AREAS
 - WAITING AREAS
 - SERVICE AREAS
 - SURROUNDING COMMUNITY
- NATURE OF SURROUNDING COMMUNITY

The adequacy or condition of physical facilities may pose a barrier to obtaining health care for some people. The first four measures shown here primarily concern two kinds of facilities that may have such an effect: parking space and waiting rooms. The first two assess adequacy of parking space and of waiting area facilities. The third one comprises a number of quantitative measures of the physical environment, while the fourth measures patients' perceptions of the environment (including the surrounding community) as well as the convenience of the facilities. The last item shown is a descriptive measure of the surrounding community. If it is unpleasant or threatening to the eligible population it may be a significant barrier.

ACCESSIBILITY OF HEALTH CARE
MEASURES AND INDICATORS: BARRIER-RELATED
PHYSICAL FACILITY CHARACTERISTICS

OVERVIEW

- MEASURES CITED
 - OBJECTIVE (E.G., ILLUMINATION AND NUMBER OF SEATS PER PATIENT WAITING)
 - SUBJECTIVE (E.G., PERCEPTION OF DECOR OR CONVENIENCE)
- APPLYING OBJECTIVE MEASURES STRAIGHTFORWARD
 - QUANTITATIVE INDICATORS OF FACILITY ADEQUACY EASY BUT COARSE
 - PHYSICAL AND ENVIRONMENTAL CHARACTERISTICS
 - CITED IN HUMAN FACTORS LITERATURE
 - CAN COMPARE TO EXISTING STANDARDS (E.G., OSHA)
- SUBJECTIVE MEASURES REQUIRE SURVEYS
 - COST
 - BIAS
- OVERALL FEASIBILITY
 - MOST MEASURES EASY TO APPLY
 - ROLE OF INNOVATION AS CAUSE POSSIBLY STRAIGHTFORWARD

Measures for assessing physical facility characteristics as barriers to obtaining care include both subjective and objective ones. Objective measures can be used to assess the characteristics themselves, but perceptions of convenience and environment (e.g., decor) are subjective.

In general, applying the objective measures would be straightforward. The ratios of patients to facilities suggested as quantitative indicators of adequacy would be easy to apply if relatively coarse assessments were acceptable. For most uses this would be the case. Pertinent measures of the environment include noise and illumination levels. These have been cited in human factors literature. These measures are easy and inexpensive to use if appropriate instrumentation is available, and they can be compared to existing standards [e.g., Occupational Safety and Health Administration (OSHA)].

To measure perceptions, surveys would be needed. Such surveys entail considerable cost and effort, and they are subject to bias. These considerations are discussed in other sections of this report (primarily "Acceptability of Health Care").

Like the measures and indicators of other barriers, these (except possibly the patient surveys) pertain only to the existence and extent of a potential obstacle to obtaining care. To determine the actual effect on care utilization, a separate study would be required. Such a study should be conducted since its results would indicate the worth of applying the measures and indicators discussed here.

In summary, the objective measures are generally easy to apply. Surveys to assess the subjective ones are feasible but costly and subject to other limitations. Use of these measures and indicators to evaluate innovations requires establishing the role of the innovation in producing observed changes. For physical facility modification, this could be straightforward, but many other kinds of innovations could have less direct impacts.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER RELATED (CONT.)

COSTS TO PATIENTS 6,7,11,19,31

- AVERAGE DIRECT COST OF CARE TO PATIENT PER OUTPATIENT VISIT OR INPATIENT STAY BY PATIENT CATEGORY (ACTIVE-DUTY, RETIRED, DEPENDENT, OTHER).
- AVERAGE COST PER OUTPATIENT VISIT OR INPATIENT STAY, FOR OTHER SERVICES IT ENTAILS (E.G., CHILD CARE, HOUSEKEEPING) BY PATIENT CATEGORY (ACTIVE-DUTY, RETIRED, DEPENDENT, OTHER)
- AVERAGE AMOUNT OF LOST EARNINGS PER OUTPATIENT VISIT OR INPATIENT STAY, BY PATIENT CATEGORY (ACTIVE DUTY, RETIRED, DEPENDENT, OTHER)
- AVERAGE AMOUNT AND COST OF INSURANCE COVERAGE, BY KIND, CARRIED BY THE APPROPRIATE SEGMENTS OF THE ELIGIBLE POPULATION

The four measures shown here concern costs patients may incur in seeking health care, both direct and indirect. Only the first measure is of direct cost. It is the total direct care cost per encounter paid by the patient out-of-pocket. The second is the indirect costs paid by the patient out-of-pocket while the third is income foregone by patients as a result of seeking care. These measures would be assessed separately for inpatient and outpatient care. For applications on the Military Health Care System (MHCS), they would be assessed by eligibility category.

The last item measures insurance coverage by various kinds. This is not a relevant measure when evaluating the MHCS. The MHCS-eligible population receives care as a benefit of military affiliation.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED

COSTS TO PATIENTS

OVERVIEW

- DIRECT (PROFESSIONAL SERVICES, HOSPITAL, NURSING HOME, ETC.)
 - MOST CITED
 - MEASUREMENT STRAIGHTFORWARD
 - AGGREGATE NATIONAL DATA ON COSTS AVAILABLE (SSA)
 - DATA ON SUB-GROUPS
 - RECORDS OF LOCAL ORGANIZATIONS
 - SURVEY OF SAMPLE
 - RECORDS
 - PATIENTS
- INDIRECT (LOST WORK, DOMESTIC SERVICES, ETC.)
 - LIMITATION: IDENTIFICATION OF RELEVANT COSTS
 - POSSIBLE METHODS
 - ESTIMATES
 - SURVEY OF SAMPLE
- INSURANCE COVERAGE NOT RELEVANT TO MILITARY HEALTH CARE SYSTEM
- MEASURES AND INDICATORS NOT INFORMATION ABOUT EFFECT ON UTILIZATION

CONTINUED p. 192

Costs of care to patients can be categorized as direct or indirect. Direct costs include those of professional services, of hospital or nursing home care, and of prescription medications. Most measures cited in the literature are of direct care costs. Indirect costs include all expenditures associated with obtaining care other than costs of direct care services and materials. Those most frequently cited are costs of lost work and of domestic services such as babysitting and home maintenance.

Measuring direct costs is reasonably straightforward. Aggregate nationwide data on the direct cost of care are available from the Social Security Administration of the U.S. Department of Health, Education, and Welfare. These data, however, would not be useful for studying a specific local population. The variation in cost among geographic areas can be great. For this purpose disaggregated local data are needed on a case-by-case basis. These data may be available at individual facilities or from local professional organizations and government agencies. Otherwise, the extensive effort of sampling records or surveying patients would be required.

Indirect patient costs may be significant barriers to obtaining care. Unfortunately, they are generally more difficult to measure than direct costs. The primary difficulty is identifying the costs to measure. Two possible methods of obtaining information on these costs are to survey a sample of patients or to estimate the costs using recorded data. The first method would entail the limitations and costs of developing and administering a survey mentioned elsewhere in this report. The cost might be reduced by identifying an appropriate, previously used survey instrument that could be adapted. The second approach, though relatively easy and inexpensive, might produce estimates too crude to be useful. Since insurance coverage is not relevant to evaluating MHCS innovations we have not studied the feasibility of measuring it. Two possible methods that could be investigated are using information from insurance companies and surveying the eligible population.

Like other barrier-related measures and indicators, these provide information only about the existence and extent of a particular barrier but not about its actual impact on care utilization. A special study would normally be required to obtain that information. Some study of the impact of care costs of utilization has been done. The methodologies involved may provide guidance, but the results are too case specific to be directly useful.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED

COSTS TO PATIENTS (CONT.)

OVERVIEW (CONT.)

● OVERALL FEASIBILITY

- DIRECT COST: GENERALLY STRAIGHTFORWARD
 - NATIONAL DATA AVAILABLE
 - FOR SUBPOPULATIONS EFFORT DEPENDS ON
 - DETAIL NEEDED
 - LOCAL DATA AVAILABILITY
- INDIRECT COST: MUCH MORE DIFFICULT
 - ESTIMATION FOR SUBPOPULATION
 - SURVEY PATIENTS
- ROLE OF INNOVATION AS CAUSE

In summary, measuring direct care costs is feasible. The level of effort required for a specific application, however, can be great depending on the detail required and the availability of data. It is less feasible to assess indirect costs since the alternatives are a costly survey of crude estimates. In evaluating the impact of an innovation, it is necessary to monitor other factors affecting costs and to establish the role of the innovation in producing cost changes.

ACCESSIBILITY OF HEALTH CARE

MEASURES AND INDICATORS: BARRIER-RELATED (CONT.)

SOCIAL AND DEMOGRAPHIC CHARACTERISTICS

- MEASURES AND INDICATORS OF ACCESSIBILITY OF HEALTH CARE TO POPULATION SEGMENTS DEFINED BY SOCIAL AND DEMOGRAPHIC CHARACTERISTICS (AGE, SEX, RELIGIOUS CONVICTIONS, RACE, EDUCATION, ETHNIC BACKGROUND, ECONOMIC STATUS, ETC.) ARE THE PREVIOUSLY LISTED ACCESSIBILITY MEASURES AND INDICATORS APPLIED TO THE POPULATION SEGMENTS OF INTEREST 15, 16, 20, 26, 30
- STUDIES OF ACCESSIBILITY OF HEALTH CARE TO THE MHCS-ELIGIBLE POPULATION MAY USE, IN ADDITION TO MORE GENERAL ONES, CHARACTERISTICS UNIQUE TO THAT POPULATION (ELIGIBILITY, CATEGORY, RANK, ETC.)

To measure social and demographic characteristics as barriers to access, one would apply the previously listed accessibility measures and indicators to population segments determined by the characteristics of interest. In a study of the Military Health Care System (MHCS), some characteristics unique to the MHCS-eligible population, such as rank or eligibility category, might be used in addition to general characteristics like age, education, and economic status.

ACCESSIBILITY OF HEALTH CARE
MEASURES AND INDICATORS: BARRIER-RELATED
SOCIAL AND DEMOGRAPHIC CHARACTERISTICS

OVERVIEW

- THOUGHT OF AS BARRIERS BECAUSE SUBGROUPS ARE AFFECTED DIFFERENTLY
- IN ORDER TO STUDY MUST IDENTIFY APPROPRIATE CHARACTERISTICS
 - GENERALLY EASY
 - ONLY CONTROVERSY, WHICH ATTRIBUTES MOST USEFUL
 - CONSIDER POPULATION-SPECIFIC ATTRIBUTES
- SOME DATA IN MEDICAL RECORDS
- SOME DATA FROM ADDITIONAL SURVEY QUESTIONS
- OVERALL FEASIBILITY: DEPENDS ON AVAILABILITY OF DISAGGREGATED DATA

Social and demographic characteristics are not, in themselves, barriers to utilization of health care services. However, the barriers previously discussed affect different population segments in different degrees. For example, distance and transportation may affect rural populations more than urban ones. The characteristics (e.g., rural location) of more strongly affected population segments are often thought of as barriers. Studying social and demographic characteristics as barriers thus requires disaggregating the previously discussed accessibility measures and indicators according to the characteristics of interest. The only additional considerations in determining the feasibility of such a study are what characteristics are appropriate and whether disaggregated data can be obtained and analyzed.

In general, the pertinent social and demographic characteristics are easily identified. The only controversy seems to be which of several correlated attributes (e.g., wages and educational attainment) is most useful. There may also be significant attributes peculiar to the population of interest in a particular evaluation. For the MHCS-eligible population, the eligibility category (active-duty, retired, dependent, or other) and rank are potentially significant attributes.

It often requires little additional effort to obtain disaggregated data for the previously discussed accessibility measures. In fact, those data are normally disaggregated by at least some of the characteristics of interest.

Some social and demographic data in medical records could be used in studying the general measures and indicators. When surveys are developed or adapted, questions about such characteristics may often be added with relatively little difficulty. Whether or not it is possible to obtain data as needed for a particular evaluation will be case specific.

ACCESSIBILITY OF HEALTH CARE

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ACCEPTABILITY OF HEALTH CARE

ACCEPTABILITY OF HEALTH CARE

DEFINITION

THE EXTENT TO WHICH HEALTH CARE MEETS THE
SUBJECTIVE AND OBJECTIVE EXPECTATIONS OF
THOSE DIRECTLY CONCERNED WITH IT

Acceptability of health care is the extent to which the care meets the subjective and objective expectations of those directly concerned with it. Those directly concerned include the population eligible for care as well as the system staff and management. Their expectations, which may be personal or professional, involve all areas of health care system effectiveness, primarily quality, accessibility, and availability of care.

ACCEPTABILITY OF HEALTH CARE

RATIONALE

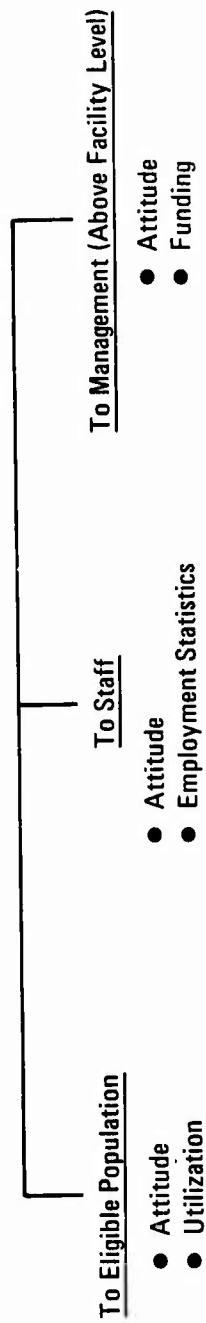
- IMPORTANT TO ACHIEVEMENT OF MHCS MISSION AND OBJECTIVES
 - MAINTAINING A HEALTHY, OPERATIONALLY READY MILITARY FORCE
 - ENCOURAGING CAREER COMMITMENTS AND IMPROVING MORALE
 - ENSURING THE AVAILABILITY OF HEALTH CARE MANPOWER
- CONTRIBUTES TO OTHER AREAS OF EFFECTIVENESS
 - QUALITY
 - APPROPRIATENESS OF UTILIZATION
- CONTRIBUTES TO ECONOMY

The MHCS must be acceptable to both users and providers if it is to meet its mission and objectives. An unacceptable health care system may deter active-duty personnel from seeking necessary health care, thereby reducing their performance capabilities and the system's ability to maintain their health. Further, providing health services to retirees and dependents will not improve morale or encourage career commitments if the MHCS is unacceptable to them.

Effects on morale and career commitments are particularly important in achieving the objective of maintaining a staff of high-quality health professionals in an all-volunteer force.

Acceptability of health care may also contribute to the effectiveness achieved in other areas discussed in this report, especially quality and appropriateness of utilization. It may encourage or discourage users in seeking necessary health care on a timely basis. Patients, satisfied with health care delivery may be more inclined to follow medical instructions. Furthermore, retention of high-quality health professionals contributes directly to health care quality in terms of structure. Finally, these factors may contribute to improved health care outcomes and more economical health care delivery.

SUBAREAS OF EFFECTIVENESS AND
MAJOR KINDS OF MEASURES AND INDICATORS
FOR ACCEPTABILITY OF HEALTH CARE



We have defined three subareas of acceptability in terms of the three major groups to whom the MHCS must be acceptable: the population eligible for care, the staff of the health care facilities, and management above the facility level. All persons eligible to use the MHCS are considered in the first subarea, including those who do not actually use the system. The facility staff comprises physicians, nurses, technicians, and others directly involved in providing health care, as well as the facility's management and support personnel. Management above the facility level includes offices from the Surgeons General to the Office of the Secretary of Defense, other executive agencies, and Congress. A particular evaluation may be concerned with one or more of these, or parts of them. The chart lists the main kinds of measures and indicators that we have identified as applicable to each subarea.

ACCEPTABILITY OF HEALTH CARE: TO ELIGIBLE POPULATION

MEASURES AND INDICATORS

● SCORE ON SURVEY MEASURING ATTITUDE 1, 4-6, 8-12, 17-19

- QUALITY OF CARE
- ACCESSIBILITY OF CARE
- AVAILABILITY OF CARE
- HEALTH CARE PROVIDERS' PERSONAL CHARACTERISTICS
- FACILITY, ENVIRONMENT, AND AMENITIES
- OTHER

● PERCENT OF ELIGIBLE POPULATION USING FACILITY 5, 6

● NUMBER OF APPOINTMENTS CANCELLED 6

● NUMBER OF APPOINTMENTS MISSED ("NO SHOWS") 6

BY
ELIGIBILITY CATEGORY

- ACTIVE-DUTY
- RETIRED
- DEPENDENTS
- OTHER

Of all the items listed on this chart, only the first—an attitudinal survey score—is a direct measure of the acceptability of health care to the eligible population. Surveys can include detailed questions about specific aspects of the system, in particular, about those listed. The first three kinds of questions are about patients' general perceptions of quality, accessibility, and availability of care. The others are more specific and warrant further explanation. Questions about the personal characteristics of health care providers assess the patients' perceptions of those individuals—their compassion, friendliness, and willingness to spend time with the patient. Questions pertaining to facilities, environment, and amenities are concerned with the pleasantness of surroundings—whether waiting rooms are crowded, and whether the patient's needs and rights are duly respected.

Changes in the percentage of the eligible population using the MHCS, numbers of appointments cancelled, and numbers of appointments missed, are quantitative indicators that may reflect a change in the acceptability of the health care system.

ACCEPTABILITY OF HEALTH CARE: TO ELIGIBLE POPULATION

OVERVIEW

- BASIC INFLUENCING ELEMENTS
 - PERCEIVED PHYSICIAN COMPETENCE
 - PERCEIVED PERSONAL QUALITIES OF
 - PHYSICIAN
 - OTHER HEALTH CARE PERSONNEL
 - PERCEIVED COMPASSION
 - COST AND CONVENIENCE
 - IMPRESSION OF MILITARY
 - PRIOR CIVILIAN EXPERIENCE
- PRIMARY KIND OF MEASURE: ATTITUDINAL SURVEY
 - MUCH USED
 - UNDERGOING REFINEMENT
 - TESTING FOR VALIDITY AND RELIABILITY
 - ESSENTIAL FOR NEW INSTRUMENT
 - REQUIRED FOR ALREADY TESTED INSTRUMENT IF
 - MODIFIED
 - DIFFERENT POPULATION
 - TRUTHFULNESS OF RESPONSES
 - ADMINISTERING SURVEY
 - ASSOCIATED COSTS

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The basic elements influencing health care system acceptability to the eligible population include the patient's perception of: competence and personal qualities of the physicians and other health care personnel, the compassion of the system, cost, and convenience. The patient's assessment of and satisfaction with the MHCS may also be affected by his prior experiences in the civilian sector and his overall impression of the military. Thus, the organizational image of the military may have some impact on MHCS acceptability to the eligible population. The converse, of course, is true as well.

Recently, much work has been done in studying patient satisfaction with health care. Attitudinal surveys based on varying methodological approaches have been used in the studies. The state of the art is such that the surveys are undergoing continual, significant refinement. If it is necessary to devise a new test instrument for an evaluation, extensive pretesting is required to ensure its validity and reliability. By using an already tested scale, this complication can be reduced. Any necessary modifications for a particular application of the survey, however, will require some pretesting of the survey instrument. Testing will also be necessary if the survey is to be administered to a population that differs from that for which it has been treated. The validity of the instrument includes its ability to elicit truthful responses from patients. Often, patients will respond with a socially acceptable answer due to fear that the unacceptable response will be exposed. This is a limitation in all attitudinal analyses. It is the purpose of the pretest to minimize such limitations. In conducting surveys, a great deal of care is also required to select a statistically valid sample and to administer the survey in such a way that an adequate response rate is obtained. These requirements for planning and conducting surveys make them time-consuming and often quite costly, depending on the extent of testing required and the size of the sample needed.

ACCEPTABILITY OF HEALTH CARE: TO ELIGIBLE POPULATION

OVERVIEW (CONT.)

- UNCERTAINTY IN ATTRIBUTING CAUSE, ESPECIALLY
 - SMALL CHANGE
 - INTERVENING FACTORS
 - THE SURVEY IS NOT EXPLICIT
- OVERALL FEASIBILITY
 - CONDUCTING SURVEY GENERALLY FEASIBLE THOUGH OFTEN COSTLY
 - USEFULNESS OF RESULTS DEPENDS ON OVERCOMING LIMITATIONS

Establishing a causal relationship between an innovation and a measured change is a major limitation in evaluating effects on acceptability. There is some uncertainty that a change in attitude will result from a specific change in the MHCS. If the observed change is small, if intervening factors are major or many, and if the survey has not been validated or is not explicit about the innovation, that uncertainty will be greater.

In summary, it is generally feasible though often costly to conduct attitudinal surveys. The usefulness of the results obtained depends on the reliability and validity of test instrument used and success in establishing the role of the innovation in causing a change.

ACCEPTABILITY OF HEALTH CARE: TO FACILITY STAFF

MEASURES AND INDICATORS

- SCORE ON ATTITUDINAL SURVEY 4,6,7,8,15,17,19
 - FACILITIES AND EQUIPMENT
 - STAFF COOPERATION
 - QUALITY OF CARE
 - OTHER
- SCORE ON JOB SATISFACTION SCALE 2,6
- TURNOVER RATE OF CIVILIAN PERSONNEL 2,6
- PERCENT OF MILITARY PERSONNEL REQUESTING TRANSFER PER YEAR, BY REASON 2,6
- AVERAGE NUMBER OF DAYS ABSENT PER PERSON PER YEAR, BY TYPE OF ABSENCE (SICK LEAVE, PAID/UNPAID VACATION, AWOL, ETC.) 2,6
 - CIVILIAN
 - MILITARY
- AVERAGE PERCENT PERSONNEL ABSENT PER DAY, BY TYPE OF ABSENCE 2,6
 - CIVILIAN
 - MILITARY

BY
PERSONNEL
CATEGORY

Six measures and indicators of health care acceptability to the staff of a health care facility appear on this chart. Only the first, scores on an attitudinal survey, measures acceptability itself. The remaining ones are indicators.

An attitudinal survey can include detailed questions about the facility and its equipment, staff cooperation, quality of care, and other items deemed appropriate. Individuals having experience with the innovation being evaluated can be specifically questioned about it. Various techniques are available for deriving a score from the survey responses.

A job satisfaction scale is the first of the indicators shown. The remaining ones are staff turnover and absenteeism. A number of studies have suggested these as indicators of job satisfaction.

ACCEPTABILITY OF HEALTH CARE: TO FACILITY STAFF

OVERVIEW

- BASIC CONTRIBUTING ELEMENTS, PERCEPTIONS
 - FACILITIES AND RESOURCES
 - STAFF COOPERATION
 - QUALITY OF CARE
- ONLY ONE DIRECT MEASURE: SCORE ON ATTITUDINAL SURVEY
 - ENTIRE STAFF
 - SAMPLE
 - PORTION OF STAFF FAMILIAR WITH INNOVATION
 - DEVELOPMENT AND VALIDATION OF INSTRUMENT
 - ASSOCIATED COSTS

CONTINUED p. 220

Acceptability of health care to the facility staff providing care has a number of basic elements. They include the perceptions of: the adequacy of facilities and resources available to provide care; the existence of the necessary cooperation among staff members; and the general quality of the care provided to patients.

Only one of the items on this chart is a direct measure of acceptability: the score on an attitudinal survey administered to the entire facility staff, to a sample of the staff, or to the particular part of the staff familiar with effects of the innovation. To evaluate a particular innovation, a special survey instrument will probably have to be designed. As discussed in relation to surveys of patients, a new instrument must be tested for validity and reliability. Designing and testing a new survey instrument entail substantial professional effort and are thus time consuming and costly.

A statistically valid sample must be selected when only a sample of the staff is to be surveyed, and the response rate must be adequate. Obtaining a suitable response rate is probably somewhat easier for staff than for patients.

ACCEPTABILITY OF HEALTH CARE: TO FACILITY STAFF

OVERVIEW (CONT.)

- OTHER POSSIBILITIES ARE INDICATORS
 - SURVEY JOB SATISFACTION
 - CONSIDERABLE EXPERIENCE IN MEASURING
 - RELIABLE RESULTS OBTAINABLE
 - OTHER POSSIBLE INDICATORS OBJECTIVE, DATA AVAILABLE
 - NONE EVALUATED AS INDICATOR
- UNCERTAINTY IN ATTRIBUTING CAUSE
- OVERALL FEASIBILITY
 - FOR DIRECT MEASURE
 - GENERALLY FEASIBLE THOUGH OFTEN COSTLY
 - USEFULNESS OF RESULTS DEPENDS ON OVERCOMING LIMITATIONS
 - FOR INDICATORS
 - APPLICATION HIGHLY FEASIBLE
 - USEFULNESS OF RESULTS UNCERTAIN

All other ways identified for assessing health care acceptability to the staff entail the use of indicators. Job satisfaction could be an indicator of acceptability, and there is substantial experience in measuring it. Consequently, it is likely that existing survey instruments could be used and some fairly reliable results obtained on job satisfaction. The other possible indicators are quantitative measures of job-related behavior (e.g., absenteeism) for which data are readily available. Neither job satisfaction nor the other items identified, has been evaluated to determine their validity as indicators for this purpose.

As elsewhere, establishing a causal relationship between the innovation being evaluated and observed changes is a major limitation.

In summary, direct measurement of health care acceptability to the staff of a health care facility by means of surveys is feasible. The special-purpose staff surveys required would be costly. The usefulness of the results would depend on the reliability and validity of the survey instruments and success in establishing a causal relationship between the innovation and observed changes. Applying the indicators mentioned is highly feasible, but their usefulness is uncertain since they have not been validated.

ACCEPTABILITY OF HEALTH CARE: TO MANAGEMENT
(ABOVE FACILITY LEVEL)

MEASURES AND INDICATORS

- SCORE ON SURVEY OF ATTITUDES TOWARD MHCS
- SCORE ON SURVEY OF ATTITUDES TOWARD FUNDING MHCS

The two measures shown for evaluating health care acceptability to management above the facility level involve attitudinal surveys. We found no references to such measures in the literature, nor did we identify any suitable indicators for this sub-area of effectiveness. The surveys suggested on this chart are given as possible measures for consideration.

ACCEPTABILITY OF HEALTH CARE: TO MANAGEMENT (ABOVE FACILITY LEVEL)

OVERVIEW

- ONLY MEASURE IDENTIFIED: ATTITUDINAL SURVEY
- NO REFERENCES OR APPLICATIONS IDENTIFIED FOR THIS USE
- LIMITATIONS
 - DEFINITION AND SIZE OF SURVEY POPULATION
 - DESIGN AND VALIDATION OF INSTRUMENT
 - ATTRIBUTING CAUSE
- OVERALL FEASIBILITY
 - RESULTS ACHIEVABLE BUT COSTLY, USEFULNESS DEPENDS ON OVERCOMING LIMITATIONS

Management's satisfaction with the Military Health Care System would best be measured by an attitudinal survey. However, we have found no references to the design or use of surveys for this purpose. A basic question in this area is the delineation of the levels of management that should be included in the survey.

Potential limitation is that the small size of the appropriate population may make strict statistical sampling difficult, and surveying the entire population may be unacceptable to them.

Difficulties inherent in all attitudinal surveys, such as design and validation, will arise and are solvable. Attributing the cause of an observed change to the innovation whose impact is being evaluated exists here as elsewhere.

Evaluation by means of a survey is feasible and will produce results whose usefulness depends on the reliability and validity of the test instrument and success in establishing the innovation as the cause of a change. The costs of developing and testing a new survey instrument are substantial.

ACCEPTABILITY OF HEALTH CARE

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9. APPROPRIATENESS

APPROPRIATENESS OF UTILIZATION
OF HEALTH CARE

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE

DEFINITION

THE EXTENT TO WHICH HEALTH CARE
USED IS NEEDED AND TIMELY

The appropriateness of utilization is the extent to which health care used is needed and timely.

The extent to which health care used is needed includes whether the services used are necessary and whether those used are all that are necessary for effective health care. The need for services includes more than just the physical need for medical attention. It also includes the psychological and emotional need for physician or provider reassurance.

The extent to which health care used is timely refers to the use of preventive medicine as well as treatment of illness or injury. This timeliness of health care delivery is affected by the actions of the patient in notifying the system of his needs and the response of the system to this notification.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE

RATIONALE

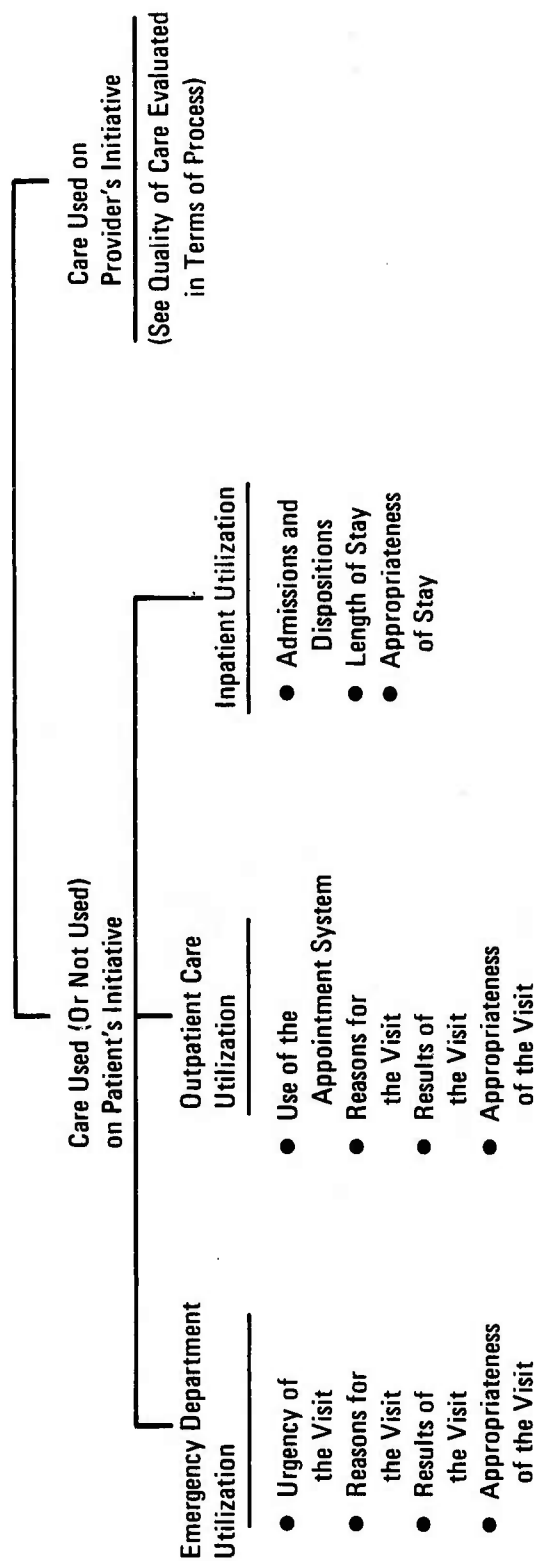
- INAPPROPRIATE UTILIZATION HAS TWO ASPECTS
 - OVERUTILIZATION
 - UNDERUTILIZATION
- OVERUTILIZATION
 - IS WASTEFUL
 - MAY RESULT IN MISALLOCATION OF RESOURCES
- UNDERUTILIZATION
 - MAY INCREASE MORTALITY AND MORBIDITY
 - MAY RESULT IN HIGHER UTILIZATION RATES LATER
- APPROPRIATE UTILIZATION IS AFFECTED BY STRUCTURE, AVAILABILITY, AND ACCESSIBILITY
- APPROPRIATE UTILIZATION IMPROVES EFFICIENCY AND EFFECTIVENESS OF THE SYSTEM

For a health care facility to effectively serve the patient population, available services must be used appropriately by patients and by providers on behalf of patients. There are two distinct kinds of inappropriate utilization: overutilization and underutilization.

Overutilization, the use of unneeded services is ineffectual and inefficient. It may cause resources to be unavailable where they are needed. Underutilization, failure to use needed services, may result in increased morbidity or mortality rates or in use of more services at a later time in a less effective way.

Motivation for the appropriate utilization of services, especially by the patient, may be affected by the structure, availability, and accessibility of the health care system. Appropriate utilization of health care by patients and providers should result in increased efficiency and effectiveness of the system.

**SUBAREAS OF EFFECTIVENESS
AND KINDS OF MEASURES AND INDICATORS
FOR APPROPRIATENESS OF UTILIZATION OF HEALTH CARE**



Appropriateness of utilization of health care can be divided into two sub-areas in terms of who is responsible for initiating the use of a particular service: the patient or the provider.

Health care services used on the patient's initiative consist mostly of visits to emergency departments and outpatient care sites, although in some cases inpatient utilization can be at patient initiative. All visits by outpatients, including referrals and followup visits, will be considered in evaluating the appropriateness of patient-initiated utilization since it is the patient's responsibility to present himself for any visit. The appropriateness of the visit must be judged on the basis of the patient's knowledge of his condition and of the services available, and whether he is following his provider's instructions.

Health care services used on the provider's initiative have been discussed in the section of this report on quality evaluated in terms of the process and will not be considered further in this section. Also excluded is utilization required by the MHCS, such as immunizations and physicals. It should be noted that evaluating quality in terms of the care process includes assessing the appropriateness of referral and followup instructions regardless of the patient's response. Thus, evaluating utilization appropriateness in such cases must be done from both patient and provider points of view.

One aspect of appropriateness of utilization is the patient's choice of the emergency department, an outpatient care site, or in some cases, inpatient admission as their entry point into the system. We have defined three subareas of patient-initiated care in terms of these three entry choices.

Emergency departments at different health care facilities are not all designed and run to handle the same caseload mix. Many emergency departments are expected to handle certain nonurgent cases on a routine basis in addition to real emergencies. This lack of standardization of emergency department objectives requires that a criterion of appropriateness be developed with a specific facility in mind.

Appropriateness of outpatient care utilization includes appropriateness of use of the patient appointment scheduling system, if one exists, of telephone consultations with providers, and of the choice of care site used to enter the system in addition to the necessity and timeliness of care sought.

Inpatient utilization on the patient's initiative is infrequent. In this subarea we include certain unusual conditions under which patients can directly initiate their admission or determine when they will be discharged from inpatient care.

The chart lists the major kinds of measures and indicators under each of these three categories of patient-initiated utilization.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:

PATIENT INITIATIVE, EMERGENCY DEPARTMENT

MEASURES AND INDICATORS

- NUMBER OF VISITS BY TIME OF DAY THAT ARE 17,18,20,23

- EMERGENCY

- URGENT

- NONURGENT/APPROPRIATE

- NONURGENT/INAPPROPRIATE

- DEAD ON ARRIVAL (DOA)

- NUMBER OF INCOMPLETE VISITS (PATIENT REGISTERS AND LEAVES BEFORE RECEIVING ATTENTION)

BY PATIENT CATEGORY

● ACTIVE-DUTY

● RETIRED

● DEPENDENT

● OTHER

CONTINUED p. 240

The first indicator classifies visits according to their urgency and avoidability for the several patient categories. Emergency cases are those that require immediate medical attention and delays are potentially threatening to life or function, while urgent cases are those that require medical attention only within a few hours. It is assumed that all DOA, emergency, and urgent cases are a necessary use of any emergency facility, and it is only for nonurgent cases that judgment of appropriateness will have to be made. Such a judgment will be based on the organization of the specific health care system, the patient's knowledge, and the time of day of the visit.

The number of incomplete visits (visits where the patient registers with the nurse/receptionist but leaves before receiving provider attention) should be affected by waiting time and the urgency of the case. Some incomplete visits may result from when a patient decides he does not need emergency care or that he needed only provider reassurance and this comfort was obtained before completing the visit. Long waiting times may cause patients in need of medical attention to leave without treatment.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:
 PATIENT INITIATIVE, EMERGENCY DEPARTMENT (CONT.)

MEASURES AND INDICATORS

- NUMBER OF VISTS, JUDGED APPROPRIATE/
 INAPPROPRIATE, FOR 8,11,15,17,23

- ACCIDENT, LESS THAN ____ HOURS PRIOR TO
 VISIT, AVOIDABLE/UNAVOIDABLE DELAY
- CONDITION (CURRENTLY UNDER/NOT UNDER
 PHYSICIAN'S CARE) THAT APPEARED/WORSENER
 LESS THAN ____ HOURS PRIOR TO VISIT,
 AVOIDABLE/UNAVOIDABLE DELAY
- NORMAL CONDITIONS NOT REQUIRING TREATMENT
- OTHER REASONS

BY
 PATIENT CATEGORY
 ● ACTIVE-DUTY
 ● RETIRED
 ● DEPENDENT
 ● OTHER

CONTINUED p. 242

The indicator on this chart classifies emergency department visits according to the patient's condition preceding the visit and professional judgment of the appropriateness of this use of emergency facilities. If this classification were cross-tabulated with the previously described classification of visits by urgency, a profile of patients using the emergency department could be obtained. Misuse on the part of the patient could then be identified. Collecting these data by symptom would point up which conditions are likely to trigger inappropriate utilization. This would be useful in initiating needed patient education programs.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:
 PATIENT INITIATIVE, EMERGENCY DEPARTMENT (CONT.)

MEASURES AND INDICATORS

- NUMBER OF VISITS INFLUENCED BY TELEPHONE CONVERSATION
 BY PROVIDER 11,12
- NUMBER OF VISITS INITIATED BY 18,21,23
 - PATIENT OR RELATIVE/FRIEND OF PATIENT, VISIT
 JUDGED APPROPRIATE/INAPPROPRIATE ER VISIT
 - REFERRAL BY PROVIDER FOR IMMEDIATE VISIT
 - EMERGENCY SQUAD

BY

- PATIENT CATEGORY
 - ACTIVE-DUTY
 - RETIRED
 - DEPENDENT
 - OTHER
- SYMPTOM

CONTINUED p. 244

These indicators reflect the influence of factors other than physical discomfort or anxiety on a patient's decision to present himself at the emergency department. In past studies, telephone consultations were found to be an effective way to prevent potential inappropriate use of health care facilities.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:

PATIENT INITIATIVE, EMERGENCY DEPARTMENT (CONT.)

MEASURES AND INDICATORS

- NUMBER OF VISITS, JUDGED APPROPRIATE/INAPPROPRIATE, RESULTING IN 4,18

- DEATH
- ADMISSION AS INPATIENT
- REFERRAL TO ANOTHER FACILITY
- TREATMENT AND REFERRAL TO AN OUTPATIENT CLINIC
- REASSURANCE AND REFERRAL TO AN OUTPATIENT CLINIC
- TREATMENT AND END OF EPISODE
- REASSURANCE AND END OF EPISODE

BY
PATIENT CATEGORY
● ACTIVE-DUTY
● RETIRED
● DEPENDENT
● OTHER

This indicator classifies all visits according to the action of the provider and professional judgment of the appropriateness of the emergency department visit. Death or admission of a patient indicates the urgency of the case and the necessity for emergency facilities. Enumerating visits in the other categories provides information on the kind of activity that takes place in the emergency department and how much of it could be effectively and appropriately transferred to other parts of the system.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:

PATIENT INITIATIVE, OUTPATIENT CARE

MEASURES AND INDICATORS

- NUMBER OF APPOINTMENTS FOR INITIAL/FOLLOWUP
VISIT RESULTING IN 11,15,23

- NO-SHOWS
- CANCELLATION
- VISITS
- NUMBER OF INITIAL/FOLLOWUP WALK-IN VISITS OTHER
THAN IN WALK-IN CLINIC 11,15,23
- NUMBER OF INCOMPLETE VISITS IN WALK-IN CLINIC 11,15,23

BY

- PATIENT CATEGORY

- ACTIVE-DUTY

- RETIRED

- DEPENDENT

- OTHER

- CARE SITE

The number of no-shows, cancelled appointments, visits by appointment, walk-in visits, and incomplete visits are measures of patient utilization of the appointment system. An incomplete visit is a case where a patient registers with the nurse/receptionist but leaves before receiving provider attention. All no-shows and incomplete visit would be inappropriate utilization, while visits by appointment and broken appointments may be partial indicators of proper usage. This data must be taken for each care site separately as a basis for determining appropriateness of walk-in visits.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:

PATIENT INITIATIVE, OUTPATIENT CARE (CONT.)

MEASURES AND INDICATORS

- NUMBER OF VISITS, JUDGED APPROPRIATE/INAPPROPRIATE, CAUSED BY 8,11,15,23

- ACCIDENT REFERRALS LESS THAN ____ HOURS PRIOR TO VISIT BY AVOIDABLE/UNAVOIDABLE DELAY

- CONDITION CURRENTLY UNDER/NOT UNDER PHYSICIAN'S CARE THAT APPEARED OR WORSENEED LESS THAN ____ HOURS PRIOR TO VISIT

- PATIENT DESIRE FOR PRESCRIPTION/NON-PRESCRIPTION MEDICATION

- PATIENT DESIRE/NEED FOR PHYSICAL EXAM

- PATIENT DESIRE FOR PREVENTIVE CARE OTHER THAN PHYSICAL EXAM

BY

• PATIENT CATEGORY

- ACTIVE-DUTY

- RETIRED

- DEPENDENT

- OTHER

• CARE SITE

• SYMPTOM

The next indicator classifies visits according to the patient's condition preceding the visit and professional judgment of the appropriateness of this use of the health care facilities. This data should be clinic or other care site and symptom specific to aid in identifying any inappropriate utilization.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:
 PATIENT INITIATIVE, OUTPATIENT CARE (CONT.)

MEASURES AND INDICATORS

- NUMBER OF VISITS INFLUENCED BY TELEPHONE
 CONVERSATION WITH PROVIDER 11,12
- NUMBER OF VISITS INITIATED BY
 - PATIENT OR RELATIVE/FRIEND OF PATIENT
 - PROVIDER REFERRAL FOR VISIT AT SPECIFIC TIME
 - PROVIDER REFERRAL WITH TIME OF VISIT
 OPEN-ENDED

BY

- PATIENT CATEGORY
 - ACTIVE-DUTY
 - RETIRED
 - DEPENDENT
 - OTHER
- CARE SITE

These indicators identify factors other than physical discomfort or anxiety that influence a potential patient's decision to make an appointment or present himself at a walk-in clinic. In past studies, telephone consultations were found to be an effective way to prevent inappropriate use of health care facilities.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:

PATIENT INITIATIVE, OUTPATIENT CARE (CONT.)

MEASURES AND INDICATORS

• NUMBER OF VISITS, JUDGED APPROPRIATE/INAPPROPRIATE, RESULTING IN

- ADMISSION

- REFERRAL TO ANOTHER FACILITY

- REFERRAL TO ANOTHER CLINIC

- TREATMENT OF SYMPTOMS, FOLLOWUP INTENDED/

END OF EPISODE

- SYMPTOMS DIAGNOSED, NO TREATMENT, END OF

EPISODE

- DESIRED/REQUIRED PHYSICAL GIVEN, END OF

EPISODE/ACTION TAKEN

- OTHER PREVENTIVE CARE GIVEN, END OF EPISODE/

ACTION TAKEN

BY

• PATIENT CATEGORY

- ACTIVE-DUTY

- RETIRED

- DEPENDENT

- OTHER

• CARE SITE

This indicator classifies visits according to the action taken by the provider and his professional judgment of the appropriateness of the visit. Referrals to other clinics and visits with no treatment could be a sign of inappropriate use, but criteria must be case specific.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE:

PATIENT INITIATIVE, INPATIENT

MEASURES AND INDICATORS

	BY
• NUMBER OF PATIENT-INITIATED ADMISSIONS JUDGED APPROPRIATE/INAPPROPRIATE	• PATIENT CATEGORY <ul style="list-style-type: none">- ACTIVE-DUTY- RETIRED- DEPENDENT- OTHER
• NUMBER OF PATIENTS NOT APPEARING FOR SCHEDULED ADMISSION	
• NUMBER OF PATIENT DISPOSITIONS AGAINST MEDICAL ADVICE (AMA)	• KIND OF ADMISSION <ul style="list-style-type: none">- MEDICAL- SURGICAL- PSYCHIATRIC- OTHER
• NUMBER OF PATIENT DAYS IN PROLONGED LENGTH OF STAY DUE TO PATIENT UNCOOPERATIVENESS	

In many facilities patient-initiated utilization of inpatient services is non-existent, but some facilities have provisions for some patients to admit or discharge themselves. A patient's failure to agree to a procedure or discharge can prolong hospitalization. Another example of the patient's initiative in inpatient utilization is whether he appears for a scheduled admission. In facilities where they apply, the number of patient-initiated admissions and dispositions against medical advice (AMA), the number of additional bed-days due to patients' lack of cooperation, and the number of patients who fail to appear for scheduled admissions indicate appropriateness of utilization.

APPROPRIATENESS OF PATIENT UTILIZATION OF HEALTH CARE

OVERVIEW

- LITERATURE LIMITED IN SCOPE
- NO GENERALLY APPLICABLE MEASURES AND INDICATORS
 - DEFINITION DEPENDS ON
 - CLINICAL JUDGMENT
 - FACILITY CAPABILITY AND AVAILABILITY
 - PATIENT ENVIRONMENT, KNOWLEDGE, AND EMOTIONAL STATE
 - BEST DEFINED FOR EACH SITUATION STUDIED
- DETAILED DATA NEEDED
 - DATA ON NON-USE PARTICULARLY DIFFICULT TO GET
 - GENERALLY, FEASIBILITY OF COLLECTION VARIES WIDELY
- OTHER LIMITATIONS
 - DETECTING SMALL CHANGES
 - ATTRIBUTING CAUSE
 - OTHER CHANGES DURING EVALUATION
- OVERALL FEASIBILITY
 - SOME SPECIFIC EVALUATION FEASIBLE (E.G., INTERVAL BETWEEN ONSET AND DECISION TO SEEK CARE FOR MYOCARDIAL INFARCTION)
 - TOO SITUATION-DEPENDENT FOR GENERAL STATEMENT

The literature on appropriateness of patient utilization is limited in scope. It primarily concerns utilization of emergency facilities as a primary source of care by patient populations, with underutilization of clinics by certain socioeconomic or ethnic groups, and with overutilization by insured patients. Although many measures and indicators can be identified, the health-problem and situation-dependent nature of appropriateness makes it impossible to find a single or limited set of measures and indicators that can be applied generally to judge the appropriateness of utilization. Decisions on appropriateness depend on clinical judgment, on the structure and availability of health care facilities, on the patient's environment, knowledge, and emotional state. Measures and indicators are best defined for each situation studied.

Evaluating appropriateness of utilization requires detailed data on individual cases and encounters. One of the more difficult kinds of data to collect is data on the appropriateness of non-use; that is, information on patients who do not take advantage of the health care delivery system when a visit would be appropriate. Generally, the difficulty of data collection for measures and indicators of utilization appropriateness varies widely, from easy and inexpensive to difficult and costly.

As in other areas of effectiveness, small changes would be hard to detect. Also, unless the effect of an innovation were quite large and occurred rapidly it would be very difficult to infer a causal relationship between the innovation and the effect. This limitation is greater when significant changes other than the innovation of interest are made during an evaluation.

Some evaluation of appropriateness is feasible. In particular, there are some disease or symptom-specific situations for which particular measures or indicators exist; for example, the interval between the onset of symptoms and the decision to seek care for myocardial infarction. However, evaluating appropriateness in these areas would not permit any inference about appropriateness of patient utilization generally.

APPROPRIATENESS OF UTILIZATION OF HEALTH CARE

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10. RETENTION, RECRUITMENT,
AND TRAINING

RETENTION, RECRUITMENT, AND TRAINING
OF MHCS-ELIGIBLE PERSONNEL

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE PERSONNEL

DEFINITION

THE EXTENT TO WHICH INDIVIDUALS ELECT TO
INITIATE OR CONTINUE MILITARY SERVICE
AND THE RESULTING EFFECTS ON THE RECRUIT-
MENT AND TRAINING OF MILITARY PERSONNEL

Recruitment, retention, and training of MHCS-eligible personnel is the extent to which individuals, primarily military personnel, elect to initiate or continue employment with the U.S. Government that entitles them to care in the MHCS and the resulting effects on recruitment and training of personnel for positions in Government.

The employment decisions referred to in this definition are primarily those of military personnel. Some personnel employed by other government agencies are eligible to receive care in military facilities; for example, State Department personnel on overseas assignments. The definition is intended to include the relatively small number of such personnel. This definition does not, however, include persons such as dependents or retirees who are eligible for reasons other than their current employment.

The degree of retention affects the amount of effort required to recruit and train new personnel, and the caliber of new personnel selected. It may also affect the availability of resources to retrain or provide advanced training to current personnel.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE PERSONNEL

RATIONALE

- ATTRACTING AND RETAINING SKILLED HEALTH PROFESSIONALS IS A PARTICULARLY IMPORTANT MHCS OBJECTIVE
- ENCOURAGING CAREER COMMITMENT OF PERSONNEL IS AN OBJECTIVE OF THE MHCS
- IMPROVED RETENTION MAY REDUCE RECRUITMENT AND TRAINING COSTS
- ABILITY TO ATTRACT RECRUITS WHO ARE MORE SKILLED AND QUALIFIED MAY REDUCE TRAINING COSTS
- RETENTION, RECRUITMENT, AND TRAINING CAN AFFECT OVERALL PERSONNEL PERFORMANCE AND ABSENTEEISM

The objectives of the MHCS provide the primary reason for considering recruitment, retention, and training as an effectiveness area for the system. An objective of the MHCS is to encourage career commitments of personnel. This is particularly important in the case of skilled health professionals whose private-sector opportunities make it difficult for the MHCS to attract and retain them. It is anticipated that improved retention will reduce personnel recruitment and training costs since those who reenlist have had prior service training and experience. An improved MHCS may improve the capability to attract skilled and qualified recruits. This, too, may reduce the training required. Success in retention, recruitment, and training can also affect job satisfaction and affect absenteeism and personnel performance.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE PERSONNEL: RETENTION

MEASURES AND INDICATORS

•	TURNOVER RATE	2,6,8,10,15	AS APPLICABLE, BY
•	DISTRIBUTION OF PERSONNEL YEARS OF SERVICE	12,14	• AFFILIATION
•	PERCENT OF MILITARY PERSONNEL AT DECISION POINT WHO ELECT TO CONTINUE ACTIVE-DUTY SERVICE	10	- ARMY/NAVY/AF
•	PERCENT REALIZED OF PLANNED RETENTION OF MILITARY PERSONNEL		- Officer
			- Enlisted
			- Civilian
			- OTHER
•	NUMBER OF PERSONNEL LEAVING SERVICE, BY PRIMARY REASON FOR DECISION	10,12	• LENGTH OF SERVICE
•	NUMBER OF REQUESTS FOR TRANSFER, BY REASON FOR REQUEST		• JOB CATEGORY
•	SCORES ON SURVEY OF JOB SATISFACTION	7,11,13,15	• AGE
•	RESPONSES ON SURVEY OF REASONS FOR CONTINUING OR NOT CONTINUING SERVICE		• LOCATION
			• EDUCATION
			• SEX
			• MHCS/OTHER

This chart shows eight measures and indicators that can be used to evaluate personnel retention. The first four are objective. Each of the next two has an objective component, the number of personnel leaving or requesting transfer, and a subjective component, their reasons. The last two are subjective. The objective measures and indicators concern the degree of success in retaining personnel. The subjective ones are responses to surveys that are designed to identify and assess factors that influence personnel retention.

As the chart indicates, it is of interest to separate data for these measures and indicators by personnel affiliation (Army, Navy, Air Force, and others) and other characteristics. This permits study of retention of various personnel groups and provides greater flexibility for analyses to determine which factors influence retention.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE PERSONNEL: RECRUITMENT

MEASURES AND INDICATORS

- RECRUITMENT RATE

- PERCENT OF RECRUITING GOALS ACHIEVED

- PERCENT OF APPLICANTS REJECTED

- DISTRIBUTION OF APPLICANTS' EXAM SCORES 3,9

- TOTAL DOLLARS INVESTED IN RECRUITING

- DOLLARS INVESTED PER RECRUIT

- APPLICANT SCORES ON SURVEY OF ATTITUDE TOWARD THE MHCS

- RECRUITER SCORES ON SURVEY ABOUT QUALIFICATIONS OF APPLICANTS

BY

- AFFILIATION

- ARMY/NAVY/AF

- Officer

- Enlisted

- Civilian

- MHCS/OTHER PERSONNEL

- Non-Military

- MTF

The eight measures and indicators shown here can be used in evaluating recruitment of military and civilian employees. The first six of these are objective, while the last two are subjective. The objective ones are quantitative measures of success in recruiting, of the quality of the recruits, and of the dollars spent in the recruiting effort. The subjective measures use survey techniques to assess applicants' attitudes and recruiters' perceptions of their qualifications.

As the chart indicates, it is useful for analysis to collect data for these measures and indicators by personnel affiliation (Army, Navy, and Air Force) and by MHCS personnel versus those not associated with the MHCS.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE

PERSONNEL: RETENTION AND RECRUITMENT

OVERVIEW

- NUMEROUS FACTORS AFFECT RETENTION AND RECRUITMENT
 - WITHIN THE ORGANIZATION
 - ORGANIZATIONAL IMAGE
 - INDIVIDUAL'S ROLE AND AUTHORITY
 - BENEFITS OF AFFILIATION
 - EXTERNAL FACTORS
 - POLITICAL ENVIRONMENT
 - ECONOMIC CLIMATE
 - JOB MARKET
- TASK OF EVALUATING EFFECTIVENESS
 - ESTABLISH MHCS AS REASON
 - ASSESS EFFECT
 - FOR INNOVATION: MEASURE CHANGE, CAUSE
- MHCS AS A REASON FOR RETENTION AND RECRUITMENT
 - HEALTH CARE FOR FAMILY
 - HEALTH CARE AFTER RETIREMENT
 - YOUNG, HEALTHY RECRUITS LESS CONCERNED
 - MORE IMPORTANT, LIKELY FOR HEALTH CARE PERSONNEL
 - JOB SATISFACTION A MAJOR FACTOR

In defining this area of effectiveness we have included, in addition to military personnel, others whose Federal Government employment makes them eligible for care in the MHCS. These other personnel are relatively small in number. Consequently, the following discussion is primarily concerned with military personnel.

Numerous factors affect an individual's decision to continue or initiate military or other Federal Government service. Factors within the organization itself include organizational image, the leadership to which the individual is exposed, his role and authority and the benefits he receives as a result of his affiliation. External factors include the political environment, the economic climate, and the relative demand and marketability of his talents. MHCS eligibility is one benefit of employment received by the personnel we are considering. It may thus affect their recruitment and retention.

The task of assessing effectiveness in this area includes establishing whether the MHCS is a reason for initiating or continuing employment or service and determining the amount and importance of its effect. Evaluating the impact of an innovation entails additionally, measuring changes in the system's effect in this area and establishing the innovation's role in causing them.

The impact in this area, though probably small, is potentially important. Health care benefits may motivate some to continue military service. These benefits may be attractive to persons with young children and to those within a few years of retirement who, by remaining in the service to that point, will continue to be eligible for care as retirees. It is likely to be less important as a motive for recruitment since young, healthy recruits are probably relatively unconcerned about health care. However, an impact on retention could affect the number of recruits needed, possibly allowing recruiters to be more selective. Perhaps the most important and most likely effect would be an effect on the retention and recruitment of health care professionals, particularly physicians. For such persons job satisfaction rather than health care as a benefit would be the major factor.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE

PERSONNEL: RETENTION AND RECRUITMENT

OVERVIEW (CONT.)

- SURVEYS
 - PERHAPS ONLY SOURCE OF MOTIVATION INFORMATION
 - ENTAIL SAME COST AND DIFFICULTIES AS SURVEYS OF ACCEPTABILITY
 - POSSIBLE INDICATORS
 - JOB SATISFACTION SURVEYS, FOR MHSC PERSONNEL
 - ACCEPTABILITY SURVEYS
- OBJECTIVE MEASURES AND POSSIBLE INDICATORS
 - NUMEROUS
 - DATA COLLECTION FEASIBLE
- COMBINATION OF SURVEYS AND OBJECTIVE MEASURES NEEDED TO ASSESS EFFECTIVENESS

CONTINUED p. 274

Surveys, either written or interview, are perhaps the only way to get information about the health care system's influence in motivating decisions to begin, continue, or terminate service. For MHCS personnel, results of a job satisfaction in survey may be useful as an indicator; and for MHCS as well as other military personnel the results of surveys used to evaluate care acceptability may be useful. Surveys of recruiters' perceptions can supply some information about the caliber of persons who apply and of those selected. Such surveys would entail the same costs and limitations (design, validity, reliability of survey instrument, sample selection, and followup) previously discussed in relation to surveys concerning care acceptability.

There are numerous objective measures and potential (not validated) indicators of success in retention and recruitment. A number of them can be applied using data contained in existing records. Measures include rates of reenlistment, separation, recruitment, and the distribution of personnel by years of service. Possible indicators include numbers of requests for transfers and total dollars invested in recruiting. None of these quantitative measures or indicators are useful in themselves for assessing MHCS effectiveness. Additional information is needed about the way the MHCS affects them. In the case of recruitment rates, for example, additional information is needed on the caliber of recruits. Survey information about MHCS influence on retention and recruitment is not adequate without quantitative data on rates. Thus, assessment of MHCS effectiveness in this area will require the use of a combination of surveys and quantitative measures and indicators. Determining and validating such a joint measurement, however, will be difficult and costly.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE

PERSONNEL: RETENTION AND RECRUITMENT

OVERVIEW (CONT.)

- EVALUATING IMPACT OF INNOVATION: ADDED LIMITATIONS
 - SMALL IMPACT
 - LONG-TERM COLLECTION
 - CONSIDERABLE COST
 - ATTRIBUTING CAUSE/INTERVENING FACTORS
- OVERALL FEASIBILITY
 - VERY LIMITED FOR MILITARY PERSONNEL GENERALLY
 - PROBABLY POSSIBLE FOR MHCS PROFESSIONALS

A major limitation to evaluating the impact of an innovation in this area is that the impact of most innovations is likely to be small. Thus, a long time period and significant expense would be required to detect that impact. The possibility of attributing the cause of an observed impact to the innovation is very limited. It is especially constrained by the small size of the probable impact. The long data collection period required means a greater number of intervening factors that may obscure the innovation's impact and make the determination of cause more difficult. These limitations are not as great for studies of MHCS personnel, who are much more likely to be strongly influenced by an innovation to the MHCS. The limitations would also be less severe generally in the case of a very major and visible change in the MHCS.

In summary, the feasibility of studying the impact of an innovation on retention and recruitment (at least for MHCS-eligible personnel in general) is low. It would require assessment of the MHCS effect on retention and recruitment based on survey data and recorded data. It would further require a sufficiently long study to detect a change in that effect. Finally, we would have to establish a causal relationship between the innovation and the observed change. For health care professionals such a study may be feasible due to the relatively small size of the group, their intimate concern with the health care system, and the consequently greater expected impact of the MHCS and its innovations on them.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE PERSONNEL: TRAINING

MEASURES AND INDICATORS

- DISTRIBUTION OF LEVEL OF EDUCATION/TRAINING OF PERSONNEL⁹

- DOLLAR INVESTMENT IN PERSONNEL TRAINING

- DOLLARS INVESTED PER PERSON COMPLETING A TRAINING PROGRAM/COURSE

- PERCENT OF PERSONNEL IN TRAINING PROGRAMS/COURSES⁸

- RATIO OF MILITARY INSTRUCTORS TO PERSONNEL IN DOD TRAINING PROGRAMS

BY

- AFFILIATION
 - ARMY/NAVY/AF
 - Officer
 - Enlisted
 - Civilian
- MHCS/OTHER PERSONNEL
- NON-MILITARY
- TYPE OF TRAINING
 - Basic/Continuing
 - DOD/Other
- MTF

The five measures and indicators in this list can be used to evaluate effects of an innovation on personnel training. All are objective measures. The first concerns the distribution of education and training within the military. The second and third identify the costs of training and the costs per trainee, respectively. The percent of personnel undergoing training is the fourth. The final entry, the instructor to trainee ratio, is a quantitative indicator of the quality of instruction.

The measures for evaluating training may be applied by category, including personnel affiliation, type of training, and whether the individual serves in the MHCS.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE

PERSONNEL: TRAINING

OVERVIEW

- RELATIVE IMPACT
 - MHCS PERSONNEL
 - OTHER
- RETENTION AND RECRUITMENT ARE KEYS
- EFFECT ON TRAINING
 - LEVEL
 - COSTS
- ALL MEASURES OBJECTIVE
- DATA AVAILABLE
 - PERSONNEL FILES AND EXPERIENCE RATING RECORDS
 - RANDOM SAMPLING
 - CONCERN FOR PRIVACY
 - MAY BE INFEASIBLE FOR PERSONNEL OUTSIDE DOD

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The impacts on training that we are concerned with in this area of effectiveness are those that result from effects on personnel retention and recruitment. Changes in personnel turnover and in the level of prior training achieved by recruits could lead to changes in the overall level of training achieved by military personnel. It might also affect the number of personnel requiring training. These changes, in turn, may lead to changes in training costs or in the quality of instruction. Thus, MHCS impacts on training would be in three general areas—the level of training achieved, training costs, and quality of instruction.

All of the identified measures and indicators are objective. The level of training and education is indicated by the distribution of the population in terms of the highest level of education for training attained. This information is included in training and educational histories as documented in personnel files and experience rating records. Because of requirements for preserving the privacy of individuals, however, arrangements for obtaining data from samples of personnel files may be difficult and time consuming. For the non-military personnel considered it may be infeasible. Some aggregate data on levels of training are available on the national level, but these are likely to be incomplete, unavailable on a timely basis, and it may not be possible to determine how representative they are of the population of interest. Further, the level of aggregation would be too gross for most evaluations.

Total training costs reflect changes in the amount of training needed. However, when cost data for different time periods are to be compared, a measure of dollars spent in relation to the training accomplished is needed. A change in this ratio could indicate a change in the quality of instruction or in instruction efficiency. Additional study would be required to determine which is the case.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE PERSONNEL: TRAINING

OVERVIEW (CONT.)

- DATA AVAILABLE (CONT.)
 - BUDGETS AND EXPENDITURES
 - OBTAINABLE FOR MILITARY TRAINING PROGRAMS
 - ONLY ROUGH ESTIMATES FOR NON-DOD TRAINING
- OVERALL FEASIBILITY
 - DATA OBTAINABLE FOR DOD CASE
 - LIMITED BY NEED TO ESTABLISH CAUSALITY

Cost data on military training exist in the military budget and records of expenditures. However, these data do not reflect all the costs of training. Certain costs such as capital expenditures are not included. For the DOD portion of the eligible population approximate values of the measures could be computed using this existing data. Obtaining these values for others in the population would be more difficult since there would probably be no single source of training cost information for this group. It would be necessary to acquire estimates of the kinds and amounts of training provided to these personnel and of the cost of this training.

The impact of a health care system innovation on personnel training considered here would result from impacts on retention and recruitment. The feasibility of studying effects on training is thus largely dependent on success in studying effects on retention and recruitment. Even if we determine that there has been a change in retention and recruitment as a result of an MHCS innovation, formidable tasks remain. We must detect an impact on training that is likely to be quite small and establish a causal relationship between that impact and the observed impacts on retention and recruitment. The associated limitations are similar to those discussed earlier for measuring changes in retention and recruitment and establishing their relationship to an innovation.

In summary, data needed to apply the measures and indicators of training could be obtained with relative ease for military personnel, but this is not the case for others in the population. The feasibility of using these measures and indicators in evaluating a specific MHCS innovation is quite limited. Detecting an impact that is likely to be small is difficult and time consuming. Establishing the innovation as a cause of the observed changes is also quite difficult. A further limitation is that success in evaluating impacts on training depends on success in assessing effects on retention and recruitment.

RETENTION, RECRUITMENT, AND TRAINING OF MHCS-ELIGIBLE PERSONNEL

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11. ABSENTEEISM

ABSENTEEISM OF MHCS-ELIGIBLE
PERSONNEL

ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL

DEFINITION

THE EXTENT TO WHICH PERSONNEL ELIGIBLE FOR
CARE IN THE MHCS FAIL TO APPEAR FOR WORK AS
SCHEDULED, FOR ANY REASON

Absenteeism as an area of MHCS effectiveness is the extent to which personnel eligible for care in the MHCS fail to appear for work as scheduled, for any reason. The definition is intended to include, in addition to military personnel, the relatively small number of non-military Federal personnel who are eligible for care in the MHCS and those retirees and dependents who are part of the labor force. The stipulation "as scheduled" in the definition excludes such prearranged absences as those for vacations, training programs, and conferences. Absences considered are thus primarily absences without justification and those due to illness.

ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL

RATIONALE

- MHCS MAY AFFECT PERSONNEL HEALTH STATUS, WHICH IS A FACTOR IN ABSENTEEISM
- DEGREE OF JOB SATISFACTION, WHICH MAY BE MODIFIED BY THE MHCS, MAY CONTRIBUTE TO ABSENTEEISM
 - MHCS PERSONNEL
 - OTHERS
- ABSENTEEISM AFFECTS OVERALL PERSONNEL PERFORMANCE
- ABSENTEEISM IS COSTLY AND DISRUPTIVE

Absenteeism of MHCS-eligible personnel is included as an area of effectiveness because health care system innovations may influence personnel health status, and health status is a factor in absenteeism. Job satisfaction may be modified by the MHCS since health and job satisfaction are related. For MHCS personnel, effects of the system on job satisfaction are more direct. Further, absenteeism affects overall personnel performance and morale. Finally, since absenteeism results in higher system costs and disrupts achievement of service goals, these possible effects on it merit attention.

ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL

MEASURES AND INDICATORS

	AS APPLICABLE, BY
● AVERAGE NUMBER OF UNSCHEDULED DAYS ABSENT PER PERSON PER YEAR 1,2,3	● AFFILIATION
● DOLLAR COST OF UNSCHEDULED PERSONNEL ABSENCES 2,3	- ARMY/NAVY/AF
● AVERAGE NUMBER OF UNSCHEDULED PERSONNEL ABSENCES PER DAY 2,3	- Officer
● DISTRIBUTION OF UNSCHEDULED ABSENCES, BY RECORDED REASON FOR ABSENCE 2	- Enlisted
● PERSONNEL RESPONSES ON SURVEY OF REASONS FOR UNSCHEDULED ABSENCES	- Civilian
● AVERAGE NUMBER OF HOSPITAL DAYS PER MHCS PATIENT PER YEAR	- Dependent
● AVERAGE NUMBER OF CLINIC VISITS PER MHCS PATIENT PER YEAR	- MHCS/OTHER PERSONNEL
	- NON-MILITARY
	- Federal
	- All Other
	● MTF

This chart shows seven measures and indicators that may be used to evaluate personnel absenteeism. The first four are quantitative measures of the extent of absenteeism. They include the numbers of unscheduled absences, their distribution according to the recorded reasons for them, and their dollar costs. The fifth is responses to interviews or questionnaires intended to reveal the underlying causes of absenteeism. It is possible that actual causes of unscheduled absences differ from reported, recorded reasons. A carefully designed and administered survey may be able to disclose some of the differences. The last two items listed are possible indicators of absences due to ill health, since they measure time that in many cases represents lost worktime.

Evaluating the measures and indicators for different groups of personnel provides greater potential for analyzing the causes and impacts of absenteeism. As the chart shows, the groups of military personnel to be considered are determined by the branch of service, whether or not they are associated with the MHCS, and whether they are officers, enlisted personnel, or civilians. The non-military personnel are considered in two groups, those who are Federal employees and those who are not.

ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL

OVERVIEW

- RELATIVELY SIMPLE CONCEPT AND MEASUREMENT
- MHCS IMPACT
 - ON HEALTH-RELATED ABSENCES
 - ON SYSTEM EFFICIENCY-RELATED ABSENCES
 - FOR MHCS PERSONNEL, THROUGH ACCEPTABILITY
- MOST COMMON MEASURE: DAYS ABSENT PER PERSON PER YEAR, BY PERSONNEL CATEGORY
 - ADVANTAGES
 - ACCEPTED
 - EXISTING RECORDS
 - TRANSLATABLE TO DOLLARS
 - WEAKNESSES
 - AVAILABILITY OF DATA FOR NON-MILITARY PERSONNEL
 - EXCLUDES JOB IMPORTANCE
 - EXCLUDES REASONS FOR ABSENCES

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Absenteeism is a simple concept and its measurement is relatively straightforward. In considering it as an MHCS area of effectiveness, we are concerned with absences related to an individual's health or his experience with the MHCS. The MHCS could affect such absences by affecting health or by making encounters with the system more efficient, thus possibly taking less time from an individual's assigned activities. For the MHCS staff, absences could also be affected by the system's acceptability to them.

The most common and easy to use measure of absenteeism is the average number of unscheduled days absent per person per year, by personnel category. This measure is generally accepted, the data are contained in existing records, and the measure can be readily converted to dollars using average personnel costs by category. Data for the measure should be fairly easy to obtain for military personnel. For others in the eligible population data are a severe limitation on use of the measure. The non-military MHCS-eligible population are found across the entire spectrum of private and government occupations.

There is no single source of data on their absences. As a result, a sample survey of individual personnel files is the only potential means of obtaining the data. Privacy considerations, however, may preclude this approach. Other weaknesses of this measure are that it does not reflect the relative importance of different jobs, nor does it indicate the reasons for absences. The latter is a particularly important limitation since only measures that include reasons for absences can generally be useful for evaluating MHCS effects on absenteeism. Without this information, there would be no way to relate absences to health or absences to the MHCS and its innovations. Even with information about reasons for absences, it will be difficult to determine the role of the MHCS and especially of an innovation in causing a change in absenteeism. A fairly complete measure of absenteeism, then, is the average number of unscheduled days absent per person per year, by personnel category and reasons for absence.

ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL

OVERVIEW (CONT.)

- RELATIVELY COMPLETE MEASURE: AVERAGE DAYS ABSENT
PER PERSON PER YEAR, BY PERSONNEL CATEGORY, BY
REASON FOR ABSENCE
 - RECORDED REASONS
 - EASIER TO OBTAIN
 - INACCURATE
 - SURVEY
 - ENTAILS DIFFICULTIES, COST
 - EXTREMELY DIFFICULT TO VALIDATE

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There are two main ways to get information on reasons for personnel absences. One is to use reasons recorded in personnel files, and the other is to administer a survey to a sample of the eligible population that asks their reasons for absences. The recorded reasons should be easier to obtain, at least for military personnel, but they may be inaccurate. In particular, illness as a reason for absence may often be inappropriately reported and recorded. A survey, on the other hand, would entail all the limitations and costs of designing and testing the survey instrument, selecting the sample, administering the survey, and ensuring an adequate response rate. These are discussed in relation to surveys for other areas of effectiveness. Moreover, the subject of the survey--reasons for absences--is likely to be perceived as sensitive and threatening. It may, therefore, be quite difficult to elicit truthful responses. This consideration would be especially relevant for military personnel if the survey were administered under military auspices. Validating responses about sensitive issues such as this is extremely difficult.

ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL

OVERVIEW (CONT.)

- INDICATOR FOR WHICH DATA AVAILABLE: PATIENT HOSPITAL DAYS OR CLINIC DAYS PER YEAR
 - CONNECTION WITH HEALTH CARE SYSTEM CLEAR
 - NOT VALIDATED AS INDICATOR
- ACCEPTABILITY IS A POSSIBLE INDICATOR FOR MHCS PERSONNEL
- RELATING MHCS TO HEALTH AND ABSENTEEISM
 - ALL DIFFICULTIES OF MEASURING HEALTH OUTCOME
 - DEFINITION OF ILLNESS
- EFFECT ON MHCS EXPERIENCES THAT ARE REASONS FOR ABSENCE
- COSTS OF LOST WORK

CONTINUED p. 298

The number of hospital days or clinic days per MHCS patient has been suggested as an indicator of personnel absences. A change in these measures can clearly be related to the health care system and possibly to a specific innovation. In addition, the required information is readily available for the entire eligible population. These measures, however, have not been validated as indicators, and their validation would be extremely difficult. There are many factors in addition to the amount of time a patient spends at the health care facility that help to determine how long he will be absent from work when he has a health problem. Acceptability of the MHCS to the staff may be correlated with staff absenteeism. This too requires validation.

Once the extent of absenteeism and the reasons for it have been assessed, the next step is to relate the absences to the MHCS and to the specific innovation to be evaluated. In part, this includes determining the system's impact on health and the consequent effect on absences. The difficulties of the first part of this task are discussed in the section of this report on quality in terms of outcomes.

Determining the relationship between health and absenteeism is complicated by subjective variations in the degree of illness that will cause different individuals to miss work. Further, minor illnesses are more disabling for some tasks than for others. Assessment of the effect of an MHCS innovation on patient experiences with the system found to be reasons for absences from work is more straightforward. These might include, for example, an individual's inability to schedule all needed clinic visits conveniently on the same day, necessitating his absence on more than one day. Finally, to complete the evaluation, it will be necessary to obtain a complete, realistic assessment of the costs of lost work days.

ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL

OVERVIEW (CONT.)

- OVERALL FEASIBILITY LIMITED
 - DATA COLLECTION
 - FEASIBLE FOR MILITARY PERSONNEL, LIMITED FOR OTHERS
 - REASONS DIFFICULT TO OBTAIN, VALIDATE
 - ESTABLISHING CAUSALITY ESPECIALLY DIFFICULT
 - ENCOMPASSES DIFFICULTIES OF TASK FOR HEALTH OUTCOME
 - MUST RELATE HEALTH TO ABSENCE

In summary, the feasibility of collecting data on numbers of absences is high for military personnel. Collecting these data on others in the eligible population is probably infeasible. For numbers of hospital days and clinic days, data are readily available for both military personnel and others eligible, but these have not been validated as indicators of absenteeism. Recorded reasons for absences may be too inaccurate to be useful. Surveys about reasons for absences could include both military personnel and others eligible, but they are difficult and costly to use and would be hard to validate. The limitations to establishing how the MHCS affects absenteeism are severe. They include those of establishing how the MHCS affects health outcomes, plus those of relating health and absenteeism. This must be done before there is any chance of showing that an innovation to the MHCS has had an effect on absenteeism.

ABSENTEEISM OF MHCS-ELIGIBLE PERSONNEL

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PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL

PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL

DEFINITION

HOW WELL AN INDIVIDUAL ELIGIBLE FOR CARE
IN THE MHCS EXECUTES HIS ASSIGNED TASKS

Personnel performance as an area of MHCS effectiveness is how well an individual who is eligible for care in the MHCS executes his assigned tasks, both qualitatively and quantitatively. The personnel referred to in this definition are both military personnel and non-military personnel who are eligible for military health care.

Qualitative aspects of performance include appropriateness of tasks executed, quality of work performed, and the individual's interpersonal relationships. Quantitative aspects of performance are efficiency and productivity.

PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL

RATIONALE

- HEALTH STATUS AND SENSE OF WELL-BEING INFLUENCE PERFORMANCE
- DEGREE OF JOB SATISFACTION, WHICH MAY BE MODIFIED BY THE MHCS, AFFECTS PERFORMANCE
 - MHCS PERSONNEL
 - OTHERS
- IMPROVED PERSONNEL PERFORMANCE MEANS MORE EFFICIENT AND EFFECTIVE USE OF MANPOWER RESOURCES AND GREATER ACHIEVEMENT OF GOALS

The capability of an individual to execute his assigned tasks is influenced by his health status and sense of well-being. They in turn may be affected by the health services he receives; thus, performance of personnel is an area in which the MHCS can have an effect. Health may affect job satisfaction, and this too has an effect on performance. For MHCS personnel, effects on job satisfaction are more direct. Changes in efficiency and effectiveness of manpower resources of the Department of Defense (DOD), and this in turn may affect achievement of DOD goals.

PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL

MEASURES AND INDICATORS

	BY
• SUPERVISOR SCORES ON SURVEY ABOUT SUBORDINATES' PERFORMANCE ⁸	• AFFILIATION
• PERSONNEL SCORES ON PERFORMANCE SELF-EVALUATION ⁴	- ARMY/NAVY/AF
• PRODUCTIVITY OF PERSONNEL ^{1,3,6}	- Officer
• RATE OF ADVANCEMENT IN GRADE OF MILITARY ENLISTED PERSONNEL	- Enlisted
	- Civilian
	- Dependent
	- NON-MILITARY
	- Federal
	- All Other
	- MHCS/OTHER
	• MTF

This chart identifies four measures and indicators that may be used in evaluating personnel performance. The first two measures are scores on surveys that ask that supervisors rate their subordinates, and that personnel evaluate their own performance. The third measure, productivity of personnel, may be evaluated using both objective standards and subjective techniques. Objective standards include industrial engineering time analyses, while subjective concerns involve the quality of the individual's performance. The final measure is the rate of advancement in grade of military enlisted personnel.

We separate these measures by personnel affiliations and the other characteristics shown to permit a thorough analysis and evaluation.

PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL

OVERVIEW

- COMMONLY RECOGNIZED ELEMENTS
 - PRODUCTIVITY
 - QUALITY
 - APPROPRIATENESS
 - WORK ATTITUDES
 - INTER-PERSONAL RELATIONS
- FACTORS CONTRIBUTING
 - WORK SATISFACTION
 - MOTIVATION
 - WORK ENVIRONMENT
 - PERSONAL HEALTH
 - INFLUENCES PERFORMANCE OF OTHERS ALSO
- TASKS SIMILAR TO THOSE FOR ABSENTEEISM
 - MEASURE PERFORMANCE
 - RELATE PERFORMANCE AND HEALTH
 - EVALUATE IMPACT ON HEALTH
- RECORDED PERFORMANCE DATA
 - FOR MILITARY PERSONNEL, EXISTS BUT NOT USEFUL
 - FOR OTHERS, INFEASIBLE TO OBTAIN

CONTINUED p. 310

Performance has five commonly recognized elements: productivity, the relationship of job input to job output; quality, the excellence of the job output; appropriateness of the tasks selected and executed; work attitudes; and interpersonal relations. Numerous factors contribute to each of these performance elements, including job satisfaction, motivation, work environment, and personal health status. The last of these, personal health status, not only influences an individual's capability to perform but it may influence the performance of his coworkers. For most of the eligible population, it is by affecting health status that the MHCS can affect performance. For MHCS personnel, an effect may come about primarily through other factors that contribute to performance.

The tasks and associated limitations in performing an evaluation of this nature are similar to those tasks for the area of absenteeism. Levels of personnel performance must be measured and related to health, and the effect of the MHCS on health must be measured. Determination of the innovation's impact on these measurements is then required.

As in the case of data on absences, data on performance could be obtained from personnel records or from surveys. Currently maintained records of performance for military personnel are efficiency (or fitness) reports. These reports, however, would not be useful for this kind of evaluation. They are subject to the bias of the rater, and there is no standard scale of measurement. Further, the reports do not indicate the state of the individual's health, and such information may be infeasible to obtain. For non-military personnel, performance ratings, if they exist, would be found in individual personnel files and probably could not be obtained.

PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL
OVERVIEW (CONT.)

- SURVEYS
 - RELATE TO HEALTH
 - FEASIBLE FOR ENTIRE RELEVANT POPULATION
 - SUPERVISORS' ASSESSMENTS
 - SELF-EVALUATION
- PRODUCTIVITY
 - SOME OBJECTIVE MEASURES POSSIBLE
 - DIFFICULT TO DEFINE FOR MOST SERVICE ORGANIZATIONS,
INCLUDING MHCS
- ACCEPTABILITY: POSSIBLE INDICATOR OF PERFORMANCE FOR
MHCS PERSONNEL

CONTINUED P. 312

Surveys might provide information about performance in relation to health. Supervisors could be surveyed about their assessments of performance and their perception of the individual's health. Self-evaluations, a recent approach to assessing performance, could be undertaken. Such evaluations would have the additional benefit of giving the individual the opportunity to evaluate his own performance and to provide the evaluation to his supervisor. These surveys would entail all of the limitations previously discussed in relation to the use of surveys, including the validity of self-reporting. Establishing the validity and reliability of self-evaluations would be especially hard to accomplish.

Of the five elements of performance listed previously, productivity is most amenable to objective measurement, depending on the job considered. It may also be somewhat easier to relate productivity and health than to establish such a relationship for the more subjective aspects of performance. A weakness of productivity measures is that many kinds of jobs, particularly those in service organizations like the MHCS, are difficult to define. Productivity measures may be of limited use, therefore, in evaluating personnel performance within the MHCS.

For personnel in the MHCS, measures of the acceptability of the system may serve as performance indicators. They require validation as indicators, however, in order to be useful.

PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL

OVERVIEW (CONT.)

- OVERALL FEASIBILITY

- PERFORMANCE MEASUREMENT FEASIBLE WITHIN LIMITS:
 - VALIDITY AND RELIABILITY OF SUBJECTIVE MEASURES
- EVALUATING IMPACT OF MHCS INNOVATION:
 - DEPENDS ON EVALUATING IMPACT ON HEALTH OUTCOME
 - REQUIRES LONG-TERM STUDY FOR SMALL IMPACTS

Successful evaluation of the impact of a health care innovation on personnel performance is dependent on success in evaluating that innovation's impact on health outcomes. Success requires that levels of personnel performance be successfully defined and measured and the significance of health in determining performance be established. The task entails all of the difficulties of evaluating impacts on health. Of particular significance, since impacts on performance are likely to be small, is the long-term data collection effort required to verify small changes.

It is feasible to measure personnel performance and to investigate the relationship between health and job performance. However, the constraints of the validity and reliability of subjective measures which must be used, and the availability of resources to undertake such an evaluation are formidable. To complete the task of relating changes in performance to an innovation in the MHCS, successfully measuring the innovation's impact on health outcomes is a prerequisite. This requires a sufficiently long time period to ensure that a change, if it has occurred, will be both observed and statistically significant.

PERFORMANCE OF MHCS-ELIGIBLE PERSONNEL

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**13. RESPONSE TO CHANGING
NEEDS**

RESPONSE TO CHANGING NEEDS

RESPONSE TO CHANGING NEEDS

DEFINITION

THE ABILITY OF A HEALTH CARE SYSTEM TO
ADAPT TO BOTH EVOLUTIONARY AND SUDDEN
CHANGES IN ENVIRONMENT AND DEMAND

Response to changing needs is the system's ability to adapt to both evolutionary and sudden changes in environment demand.

Evolutionary changes are those that occur gradually over time. Such changes may be major or minor ones and may occur over very long or relatively short time periods. Sudden changes are those that occur in a short time, usually precipitated by a specific event (e.g., a military emergency, local power failure, flood, etc.).

Changes in the environment include advances in medical science, new health care technologies, shifts in social norms, and changes in legislation affecting health care. Shifts in social norms, (acceptable patterns or traits in behavior) may change the expectations about the health care system held by those served. Changes in demand may be in amounts and/or kinds of services required.

RESPONSE TO CHANGING NEEDS

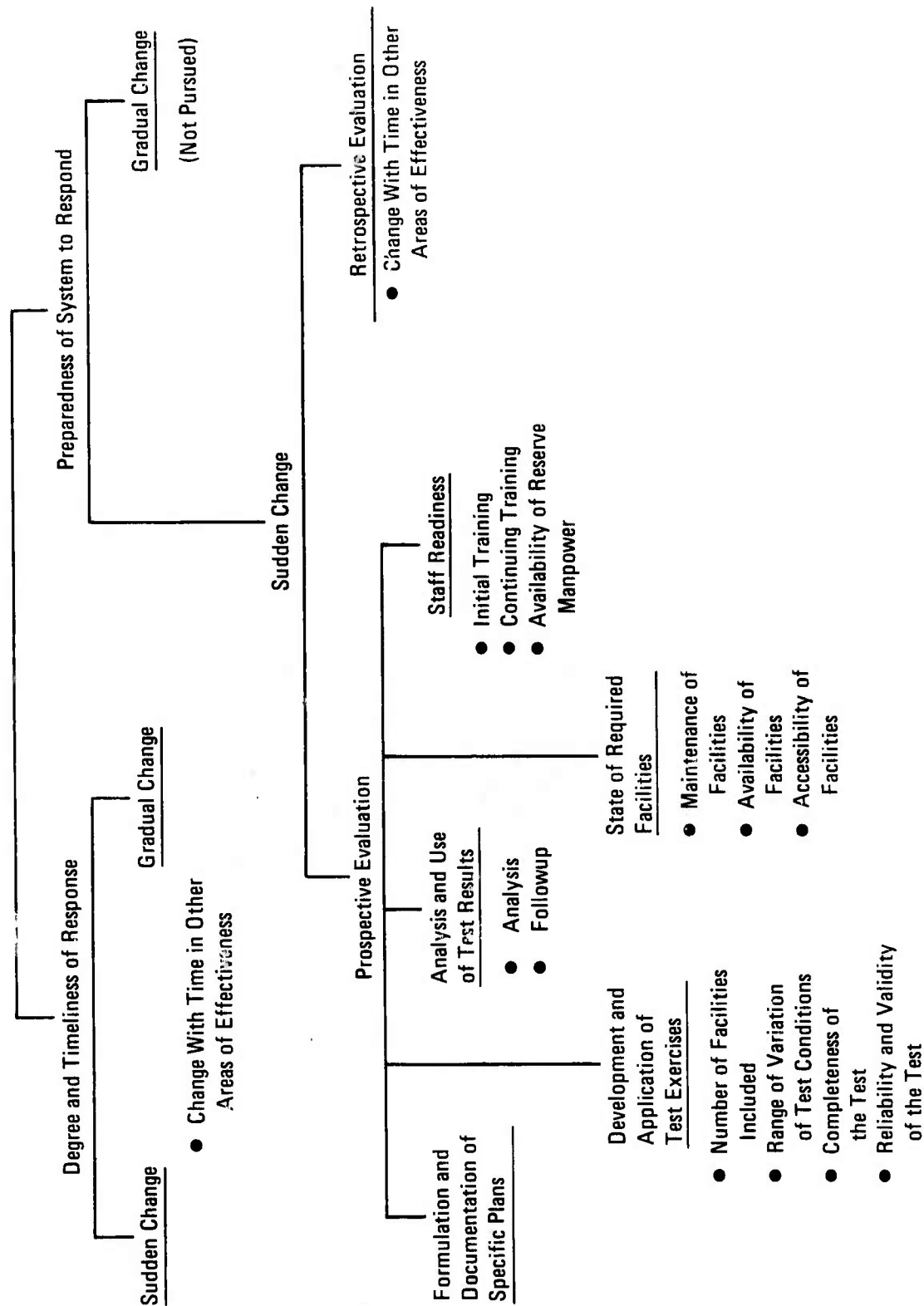
RATIONALE

- HEALTH CARE SYSTEMS FACED WITH MANY CHANGES
 - MEDICAL SCIENCE
 - TECHNOLOGY
 - HEALTH CARE STANDARDS
 - SOCIAL NORMS
 - DISASTERS
- SYSTEM MUST BE PREPARED, RESPONSIVE TO MAINTAIN PERFORMANCE
- FOR MHCS, MILITARY CONTINGENCIES ARE PARAMOUNT

Health care systems are faced with continual changes in medical science, in health care technology, and in health care standards. Society's expectations of, and thus its demands, on the system change with time. Such changes tend to be relatively gradual. In addition, health care facilities are generally subject to highly variable day-to-day demands and must respond to contingencies that can produce very rapid, extreme variations. If a health care system is to maintain high standards of performance in the face of such changes, it must be flexible and prepared to respond.

In the case of the Military Health Care System, the responsibility for meeting the demands of military contingencies is paramount. This area of effectiveness, response to changing needs, thus has particular importance for the Military Health Care System and imposes a much greater requirement for preparedness than those on health care systems generally.

SUBAREAS OF EFFECTIVENESS AND MAJOR CATEGORIES AND KINDS OF MEASURES AND INDICATORS FOR RESPONSE TO CHANGING NEEDS



There are two subareas of a system's responsiveness to change: the degree and timeliness of its response when changes occur, and its preparedness to respond.

The degree and timeliness of the system's response is the level of performance it is able to achieve and the way its performance changes with time, following or in conjunction with gradual and sudden developments that affect it.

System preparedness for change involves the system's intrinsic flexibility and planning for such changes. Preparedness for sudden change can be evaluated either prospectively or retrospectively. Prospective evaluation examines such activities as formulating plans for specific contingencies, training, and carrying out test exercises. An advantage of evaluating prospectively is that it offers the opportunity to identify and correct problems before they are raised by an actual event. Retrospective evaluation assesses the results of actual implementation of contingency plans. Preparedness for gradual change is long-range planning. There is no clear definition of what should be accomplished in this area. Thus, measures or indicators of effectiveness cannot be clearly identified. For this reason, this area—preparedness for gradual changes—is not treated further in this presentation.

RESPONSE TO CHANGING NEEDS
DEGREE AND TIMELINESS OF RESPONSE

MEASURES AND INDICATORS

- CHANGE WITH TIME IN VALUES OF THE MEASURES AND INDICATORS OF
 - QUALITY
 - AVAILABILITY
 - ACCESSIBILITY
 - ACCEPTABILITY
 - APPROPRIATENESS OF UTILIZATION

(SEE SPECIFIC MEASURES AND INDICATORS IN APPROPRIATE SECTIONS OF
THIS REPORT)

The measures and indicators of a system's actual response to change are changes with time in the values of measures and indicators of quality, availability, accessibility, acceptability, and appropriateness of utilization of health care services. These measures provide for evaluation of both the level of effectiveness achieved and the timeliness with which it is reached.

Only the areas of effectiveness considered significant to system responsiveness have been included. For some gradual changes occurring over extended periods of time it may also be appropriate to study the change with time in values of measures and indicators for the remaining areas of effectiveness: retention, recruitment, and training of MHCS-eligible personnel; absenteeism of MHCS-eligible personnel; performance of MHCS-eligible personnel; organizational image; and contributions to society; as well as for economy.

RESPONSE TO CHANGING NEEDS:
DEGREE AND TIMELINESS OF RESPONSE

OVERVIEW

- MINIMAL ATTENTION
- MUST CONSIDER ALL AREAS OF EFFECTIVENESS
- LIMITATIONS MULTIPLIED BY INTRODUCING TIME SERIES
 - ALL PREVIOUS LIMITATIONS
 - MORE COMPLEX
 - CHANGES REQUIRE CONTINUAL MODIFICATION TO
 - EVALUATION DESIGN
 - DATA BASE

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Evaluating the degree and timeliness of a system's response to change by considering changes in effectiveness over time has received minimal attention. In such an evaluation we are interested in all aspects of the dynamic response of the system. It does not suffice to consider any single or limited set of measures and indicators; all effectiveness areas must be fully evaluated over a sequence of time points. The size of such an effort would be immense so this kind of evaluation has been relatively ignored. The need to take measurements at many time points involves limitations in addition to the intrinsic limitations of the measures and indicators identified in their primary areas of effectiveness. A more complex evaluation plan is required, and cost and effort increase with the number of time intervals required by the plan. Furthermore, during the evaluation period, new and unanticipated factors may be introduced. This requires the capability to continually analyze and modify both the evaluation design and the data base. For example, in the long term, gradual technological advances may change standards. The distribution of illnesses may change as control over particular diseases improves. These changes may affect values of both objective measures and scores on surveys, thus making comparisons of different time intervals infeasible.

RESPONSE TO CHANGING NEEDS:
DEGREE AND TIMELINESS OF RESPONSE

OVERVIEW (CONT.)

- LIMITATIONS MULTIPLIED (CONT.)
 - ORGANIZATIONAL STRUCTURE
 - SYNCHRONIZATION OF MULTI-SITE COLLECTION
 - STATISTICAL ANALYSIS OF ERRORS
- FEASIBILITY DECREASES WITH INCREASE IN NUMBER OF TIME POINTS
FOR EMERGENCIES
 - EVALUATION SECONDARY
 - INEFFECTIVE GRADUAL RESPONSE AS CAUSE
- BENEFITS
 - TRENDS
 - PRECISION
- OVERALL FEASIBILITY
 - NUMBER OF MEASURES
 - NUMBER OF TIME POINTS
 - SPECIFIC INFORMATION

Additional difficulties must also be considered. An effective organization to coordinate and execute the evaluation must be maintained over a considerable period of time. The need to synchronize measurements at various sites adds complexities. Careful statistical analysis of errors in observations becomes more important when many time points are being compared. As the number of time points increases and we remain constrained by the need to evaluate each area of effectiveness, the feasibility of data collection decreases.

The preceding discussion applies whether we are evaluating the system's response to sudden changes or to gradual changes. However, for emergencies a further limitation is that it is quite difficult in such situations to collect special purpose data. Since all available personnel would be mobilized to the cause at hand we could not expect cooperating with additional, special tasks. Another aspect to consider in evaluating a sudden change is that the change may indicate an ineffective response to gradual change. Gradual changes will often go undetected or be purposefully ignored until a threshold level is reached at which action is required.

Partially offsetting the additional difficulties of a time series evaluation are additional benefits. Time series data would improve the precision of our estimates of variables that remain relatively constant over long periods but are subject to sizeable fluctuations in short periods. Additionally, valuable information on trends and predictive information would become available.

In summary, the overall feasibility of evaluating the degree and timeliness of a health care system's response to changes as discussed here is low because of the large number of measures and indicators that would have to be used. It becomes lower as the number of observations in the time series increases. Evaluating the impact of a particular innovation involves the additional difficulty of establishing the innovation's role in producing a change in the system's response. The magnitude of effort required for an evaluation of this kind would probably be prohibitive, but this depends on the specific innovation to be evaluated.

RESPONSE TO CHANGING NEEDS:

PREPAREDNESS OF SYSTEM FOR RESPONSE TO SUDDEN CHANGE

MEASURES AND INDICATORS:

RETROSPECTIVE EVALUATION

- SAME AS MEASURES OF DEGREE AND TIMELINESS OF RESPONSE

Measuring the change with time in the measures and indicators in other areas of effectiveness is appropriate for retrospective evaluation of preparedness for sudden change. These are the same measurements discussed for evaluating the degree and timeliness of a system's response to change.

RESPONSE TO CHANGING NEEDS:

PREPAREDNESS OF SYSTEM FOR RESPONSE TO SUDDEN CHANGE

MEASURES AND INDICATORS: PROSPECTIVE EVALUATION

FORMULATION AND DOCUMENTATION OF SPECIFIC PLANS

- NUMBER AND KINDS OF SITUATIONS FOR WHICH PLANS EXIST
- NUMBER AND KINDS OF PLANS DOCUMENTED

There are two general measures of the extent to which specific plans have been formulated and documented. These measures are the number and kinds of situations for which plans have been formulated, and the number and kinds of plans that have been documented.

RESPONSE TO CHANGING NEEDS:

PREPAREDNESS OF SYSTEM FOR RESPONSE TO SUDDEN CHANGE

MEASURES AND INDICATORS: PROSPECTIVE EVALUATION

DEVELOPMENT AND APPLICATION OF TEST EXERCISES

- NUMBER OF FACILITIES FOR WHICH A TEST EXERCISE HAS BEEN PERFORMED
- NUMBER OF DIFFERENT TEST SITES
- EXTENT OF GEOGRAPHIC AND CLIMATOLOGICAL VARIATIONS OF DIFFERENT TEST SITES
- EXTENT OF VARIATION IN OTHER RELEVANT EXTERNAL CONDITIONS AT DIFFERENT TEST SITES
- EXTENT TO WHICH THE TEST SIMULATES THE ACTUAL EXPECTED CONDITION
- NUMBER OF RELATED SUBUNITS INCLUDED IN THE TEST
- COMPLETENESS WITH WHICH THE TEST EXAMINES ALL FEATURES OF THE PLAN
- EXTENT TO WHICH ADVANCE KNOWLEDGE OF THE TEST HAS "LEAKED OUT"

Measures and indicators for the development and application of test exercises focus on the extent of testing that a plan has undergone. Quantitative and qualitative measures and indicators are given. The quantitative ones are the number of facilities for which a test exercise has been performed, the number of different test sites, and the number of related subunits included in the test. These measures determine how widespread the testing has been and whether or not all affected subunits--local and remote, but functionally linked to other tested subunits--have been included. The third and fourth items on the chart indicate how well we might expect the plan to work under various uncontrollable external conditions. Geographic and climatological variations affect the effectiveness of a plan, and testing should allow for variation in these factors. Which other external variations among sites are relevant depends on the details of the plan. They may include variations in distances from major supply centers, inadequacy of local water and power supplies, the kinds and quantities of specialized equipment at the sites, etc. A great many such factors may require consideration. The purpose of the fifth and seventh items shown is to determine the realism and completeness of the test. A major effort involving numerous case-specific measures and indicators may be required to evaluate these items. The final item, the extent to which advance knowledge of the test had "leaked out" should be evaluated to the degree possible. This helps to establish the validity of the test results.

RESPONSE TO CHANGING NEEDS: PREPAREDNESS OF

SYSTEM FOR RESPONSE TO SUDDEN CHANGE

MEASURES AND INDICATORS: PROSPECTIVE EVALUATION

ANALYSIS AND USE OF TEST RESULTS

- AMOUNT, KINDS, AND SIGNIFICANCE OF TEST DATA
- EXTENT TO WHICH TEST DATA HAVE BEEN ANALYZED AND STUDIED
- EXTENT OF UTILIZATION OF VALIDATED TEST RESULTS TO MODIFY THE ORIGINAL PLAN
- EXTENT OF FOLLOWUP OF TESTING AND MODIFICATION TO REFINED THE PLAN AND TO KEEP IT VIABLE IN LIGHT OF GRADUAL INTERIM CHANGE

These are measures and indicators of feedback—the extent to which test results have been analyzed and used to modify original plans. First, it is necessary to determine the amount, kinds, and significance of data available from the test exercise. The extent of test data analysis indicates the potential for realizing benefits of the test. Such analysis is necessary for identifying needed modifications. The extent of use of test results to modify the original plan is the crucial measure. A meaningful evaluation of it may require several plan-specific measures. After modifying the original plan by this feedback mechanism, tests are needed to check the value of the modifications. The tests should also be used to refine the plan and keep it viable in light of gradual interim change. The purpose of the last measure shown is to determine the extent to which this followup testing is done. A meaningful evaluation of this item will require identification and use of plan- and situation-specific measures.

RESPONSE TO CHANGING NEEDS: PREPAREDNESS OF SYSTEM FOR RESPONSE TO SUDDEN CHANGE
MEASURES AND INDICATORS: PROSPECTIVE EVALUATION

AVAILABILITY, ACCESSIBILITY, AND MAINTENANCE OF REQUIRED FACILITIES

- WHICH REQUIRED MAINTENANCE HAS BEEN PERFORMED
- EXACT INVENTORY AND STORAGE LOCATIONS FOR SUPPLIES AND MATERIALS
- FREQUENCY OF PERIODIC CHECKS TO ASCERTAIN WHETHER SUPPLIES AND MATERIALS ARE ACTUALLY STORED IN SPECIFIED LOCATIONS
- STATUS OF SUPPLIES WITH EXPIRATION DATES OR OF MATERIALS THAT MAY BECOME DEGRADED DURING STORAGE
- EXISTENCE AND PERFORMANCE OF A SYSTEM FOR TIMELY REPLACEMENT OF OUTDATED OR DEGRADED SUPPLIES
- FREQUENCY OF CHECKS OF MATERIALS THAT MAY BECOME DEGRADED DURING STORAGE
- TIME AND EFFORT REQUIRED TO OBTAIN AND ASSEMBLE FOR USE SUPPLIES AND MATERIALS NEEDED IN AN EMERGENCY

The measures and indicators for this subarea of preparedness concern resources, activities, and information necessary to ensure that the plan be fully effective when its implementation is required. To ensure that equipment will function properly, required maintenance must be performed, and records must be kept and examined. Measures of availability of required resources are the exact inventories and storage locations for supplies and materials, as well as the frequency of periodic checks to ascertain whether supplies and materials are actually stored in the specific locations. A measure of supply maintenance is the status of supplies with expiration dates and of materials whose performance may become degraded with time or due to physical conditions of storage (e.g., temperature and humidity). Good indicators in this area are the existence and performance of a system for timely replacement of outdated or degraded supplies and the frequency of checks of materials that may become degraded. An accessibility measure is the time and effort required to obtain and assemble for use supplies and materials needed in an emergency situation. Like other measures and indicators for prospective evaluation of preparedness, these measures and indicators are generally stated. Plan- and situation-specific measures will be needed for a full evaluation.

RESPONSE TO CHANGING NEEDS: PREPAREDNESS OF SYSTEM
FOR RESPONSE TO SUDDEN CHANGE

MEASURES AND INDICATORS: PROSPECTIVE EVALUATION

STAFF READINESS

- EXTENT OF TACTICAL INDOCTRINATION: INSTRUCTION OF ALL PERSONNEL AS TO THE MISSION, ORGANIZATION, CHAIN OF COMMAND, CONCEPTS AND DOCTRINE ASSOCIATED WITH THE PLAN
- EXTENT OF DUTY ASSIGNMENT TRAINING: INTENSIVE INDIVIDUAL INSTRUCTION IN SPECIFIC DUTY AREAS, AND AT LEAST ONE SUPPLEMENTARY DUTY AREA
- REGULARITY AND FREQUENCY WITH WHICH INSTRUCTION TAKES PLACE
- REGULARITY AND FREQUENCY WITH WHICH NEW STAFF MEMBERS ARE INDOCTRINATED AND TRAINED
- TIMELINESS WITH WHICH CHANGES IN THE PLAN ARE COMMUNICATED TO THE STAFF AND REQUIRED RETRAINING IS ACCOMPLISHED
- AVAILABILITY OF RESERVE MANPOWER
 - TIME REQUIRED TO MOBILIZE
 - NUMBER OF RESERVE PERSONNEL, BY CATEGORY AND SPECIALTY

The entries on this chart are concerned with the extent to which the staff has been prepared to execute the plan, and with the availability of reserve manpower. They are thus indicators of staff readiness with respect to the particular plan. Tactical indoctrination includes instruction of all personnel as to the mission, organization, chain of command, concepts, and any doctrine associated with the plan. The extent of training is the amount of intensive individual instruction in specific duty areas and at least one supplementary duty area. The regularity, or frequency, with which instruction takes place is a measure of the extent of repeated instruction or drilling. The regularity, or frequency, with which new staff members receive initial indoctrination and training indicates the overall level of staff training and indoctrination. To indicate staff readiness with respect to the most recent plan modifications, we measure the timeliness with which changes are communicated to the staff and required retraining is administered.

Availability of reserve manpower is another element of readiness for plan implementation. There are two important aspects of the availability of reserves: the time required for mobilization, and the number of reserve personnel, by category and specialty. Specific measures would be required to fully evaluate the general measures presented here.

RESPONSE TO CHANGING NEEDS:

PREPAREDNESS OF SYSTEM FOR RESPONSE TO SUDDEN CHANGE

OVERVIEW

- MINIMAL ATTENTION
- EVALUATION ALTERNATIVES
 - RETROSPECTIVE
 - SAME MEASURES AS TIME SERIES
 - USE DATA AVAILABLE
 - PROSPECTIVE (A PRIORI) EVALUATION
 - OF SPECIFIC CONTINGENCY PLANS
 - INFORMATION FOR PLAN IMPROVEMENT

CONTINUED p. 342

Evaluating the preparedness of a health care system for sudden change has generally received little attention. In the military sector a great deal of attention is given to contingency planning, but evaluations of the health care system's preparedness are not publicly documented.

Two modes of evaluation could be used: retrospective evaluation and prospective, or a priori evaluation. In a retrospective evaluation we would infer the effectiveness of preparation from the system's actual response in some prior emergency for which a careful evaluation had not been planned or possible. Retrospective evaluation measures are those already identified for time series study of the degree and timeliness of response. The difference is that in this evaluation we would rely on whatever data had been collected at the time of the emergency. The usefulness of the results would depend on the kinds, quantities, and accuracy of those data. An a priori evaluation can be carried out only if there is a specific plan intended for use to cope with an emergency or sudden change. This mode of evaluation has the advantage of providing valuable information for improving plans before they are actually needed.

RESPONSE TO CHANGING NEEDS:

PREPAREDNESS OF SYSTEM FOR RESPONSE TO SUDDEN CHANGE

OVERVIEW (CONT.)

- MOST RELIABLE APPROACH: EXERCISE OR TEST
 - TIME SERIES MEASUREMENTS
 - COSTLY
 - SIMULATION VALIDITY
 - UNANTICIPATED CHANGES
 - MEASUREMENT DIFFICULTIES
 - INTERFERENCE WITH REALISM
 - MAY AFFECT DATA
- OVERALL FEASIBILITY
 - DEPENDENT ON CHANGE AND ENVIRONMENT
 - RETROSPECTIVE, USEFULNESS LIMITED
 - A PRIORI, COSTLY

The most reliable approach for a priori evaluation is probably an exercise or test that simulates a sudden change. In such a test the measures and indicators previously discussed for evaluating a system's actual response would be applied in a time series. A test, however, would be costly, and there is no guarantee that the system would respond in a similar manner under the stress of real change. There would undoubtedly be some unanticipated changes and many for which it was very difficult to plan an adequate test evaluation. These changes, unfortunately, are those for which the emergency plan itself is most likely to be inadequate, and thus those for which the test results could be most helpful. Taking measurements during an exercise may be fraught with difficulties. One important consideration is the interference of the measurement process on the data collected.

The overall feasibility of evaluating preparedness for sudden change and the impact of an innovation on that preparedness is highly dependent on the innovation, the kind of sudden change, and the specific environment. Thus, feasibility must be judged for each case. In general, however, the usefulness of retrospective evaluation is likely to be severely limited by the kinds of data available, and a priori evaluations are likely to be large, costly efforts. Establishing a causal relationship between an innovation and a change in preparedness would be a difficult task for both retrospective and a priori evaluations.

RESPONSE TO CHANGING NEEDS

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14. ORGANIZATIONAL IMAGE

ORGANIZATIONAL IMAGE

ORGANIZATIONAL IMAGE

DEFINITION

THE OVERALL PERCEPTION OF THE MILITARY HEALTH
CARE SYSTEM AND THE MILITARY GENERALLY THAT
IS HELD BY MILITARY PERSONNEL, OTHER MHCS
BENEFICIARIES, AND THE PUBLIC

The organizational image of the MHCS and the military generally is the perception of these organizations held by military personnel, other MHCS beneficiaries, and the public. The definition refers to perceptions held generally, not just those of persons with specific knowledge about or experience with the military or its health care system.

ORGANIZATIONAL IMAGE

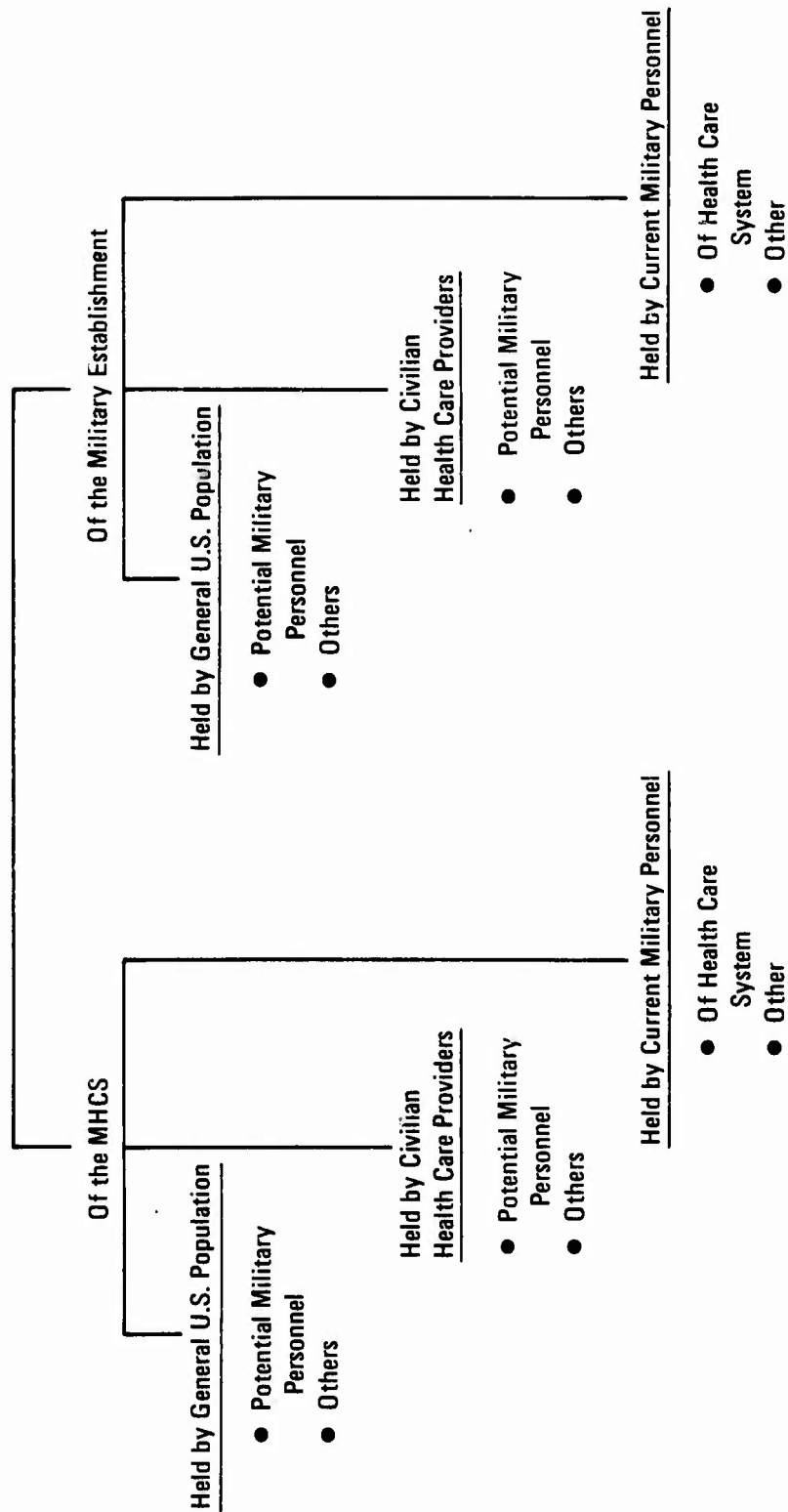
RATIONALE

- GOOD IMAGE CONTRIBUTES TO PERSONNEL MORALE, CAREER COMMITMENT, AND RECRUITMENT
 - OF HEALTH CARE PROFESSIONALS
 - OF OTHER MILITARY PERSONNEL
- GOOD IMAGE ENHANCES ABILITY OF MHCS TO PROVIDE CARE
 - TIMELY PATIENT UTILIZATION

An innovation in the MHCS can affect its image as an organization as well as the image of the military generally. The more favorable these images become the more they can help to create and maintain high morale among military personnel and to encourage career commitments of all persons employed by the military, particularly those affiliated with the MHCS. Further, the extent to which the military and the MHCS are well thought of by the general public may affect the success of recruitment efforts.

When persons who are eligible to use the MHCS have a favorable impression of the system, they may be more inclined to seek care in a timely manner.

**SUBAREAS OF EFFECTIVENESS AND
MAJOR KINDS OF MEASURES AND INDICATORS
FOR ORGANIZATIONAL IMAGE**



The subareas of organizational image are in terms of organizations whose images may be affected and of groups who hold those images of the organizations. As the chart shows, the image of the military generally and of the MHCS are considered. The groups whose perceptions of the organizations are of interest are: the U.S. population generally, civilian health care providers, and current military personnel. Among the general U.S. population we wish to study separately those who are potential military personnel. Among current military personnel, those who work in the MHCS are to be studied separately.

In practice, the distinction between the image of the military and that of the MHCS may not be clear. This is especially true for those in the U.S. population generally who have had little or no contact with either organization.

ORGANIZATIONAL IMAGE

MEASURES AND INDICATORS

- SCORES ON SURVEY OF ATTITUDE TOWARD ORGANIZATION ⁶
- RANK OF MHCS ON SURVEY OF REASONS FOR BEGINNING/CONTINUING/TERMINATING SERVICE
- PERSONNEL RETENTION RATES ¹
- PERSONNEL RECRUITMENT RATES
- AVERAGE LENGTH OF SERVICE PER PERSON ¹

BY	AFFILIATION
•	ARMY/NAVY/AF
-	Officer
-	Enlisted
-	Civilian
-	Dependent
•	OTHER

This chart shows the measures and indicators for all subareas of organizational image. All of these measures and indicators can be used to study the perceptions of military personnel. Only attitudinal surveys, the recruitment rate, and the reasons for beginning service are applicable for studying the perceptions of the general public, which includes potential military personnel.

ORGANIZATIONAL IMAGE

OVERVIEW

- CONSENSUS OF PERCEPTIONS OF EXPOSED POPULATION
- PROMINANT CONTRIBUTING FACTORS FOR MHCS IMAGE
 - PERCEIVED QUALITY
 - PERSONAL ATTENTION
 - COMPASSION AND CONCERN
 - STAFF COMPETENCE
 - COORDINATION OF CARE
 - PERCEIVED ACCESSIBILITY
 - PERCEIVED AVAILABILITY
 - PERCEPTION OF MILITARY IN OTHER ASPECTS
- BROAD RANGE OF CONTRIBUTING FACTORS FOR OVERALL MILITARY IMAGE
 - MHCS AMONG FACTORS
- ACCEPTABILITY, RETENTION, AND RECRUITMENT AS INDICATORS: REQUIRE VALIDATION
 - REQUIRE VALIDATION
- MOST DIRECT APPROACH: SURVEY OF ATTITUDES TOWARD ORGANIZATION

CONTINUED p. 356

An organizational image is the consensus of perceptions of the many people who are exposed to the organization.

Prominent factors contributing to the development of the MHCS image include perceptions of: (1) quality of care, including perceptions of personal attention, compassion and concern, staff competence, and coordination of the delivery of care; (2) accessibility of care; (3) availability of care; and (4) all other aspects of the military. The organizational image of the military in general is influenced by a broad range of factors, which may include perceptions of the MHCS. Thus, an innovation to the MHCS could affect the organizational image of the military. The degree of the effect would depend on the population whose view of the organization is considered (e.g., the general U.S. population or the MHCS-eligible population) and the visibility of the innovation to that population.

Measures and indicators of acceptability, retention, and recruitment are possible indicators of organizational image. These measures and indicators and their use in evaluating impacts of an innovation have been discussed previously in this report. Those discussions apply equally to their use in studying organizational image with one addition. If they are to be useful in this area, they must be validated as indicators of organizational image.

The most direct approach for measuring organizational image is to use a special survey of attitudes toward the MHCS and toward the military generally. Such a survey might be administered either to persons beginning, reenlisting, or terminating service, to a random sample of the MHCS-eligible population, or to a random sample of the general population.

ORGANIZATIONAL IMAGE

OVERVIEW (CONT.)

- MOST DIRECT APPROACH: SURVEY OF ATTITUDES TOWARD ORGANIZATION (CONT.)
 - DESIGN AND VALIDATION OF SURVEY REQUIRED
 - ASSOCIATED COSTS
 - FOR GENERAL POPULATION LARGER AND MORE COMPLICATED
 - IMPORTANT INTERVENING FACTORS
 - PUBLIC RELATIONS
 - FLUCTUATIONS IN NATIONAL EVENTS
 - SMALL IMPACT ON GENERAL POPULATION UNLESS INNOVATION
 - HIGHLY VISIBLE
 - IMPORTANT
- OVERALL FEASIBILITY
 - FEASIBLE FOR SPECIFIC, AFFECTED SUBPOPULATIONS
 - FEASIBLE GENERALLY IF INNOVATION IS IMPORTANT
 - DEPENDS ON
 - VALIDATION OF INDICATORS
 - VALIDITY AND RELIABILITY OF SURVEY
 - FUNDS FOR STUDY DESIGN AND IMPLEMENTATION

The difficulties of carrying out such a survey are the same as those associated with other surveys already discussed. They include design and validation of the survey instrument with their substantial costs. Moreover, surveying a random sample of the general population would be a larger, more complicated, and more costly process than the surveys discussed previously herein. Use of a survey in evaluating the impact of an MHCS innovation is limited by the difficulty of establishing a causal relationship between the innovation and an observed change in attitude. This difficulty increases as the population surveyed is broadened and a greater number of factors affect the attitudes under consideration. In conducting surveys to study the organizational image of the military generally, especially to the general U.S. population, there are several factors that can interfere. In particular, ongoing military public relations and information dissemination efforts will undoubtedly affect the military image. National events may cause temporary, but widespread changes in the perceptions of the military organization.

The MHCS and its innovations have limited visibility and importance to the overall U.S. population, especially in relation to influences such as military public relations and national events. Thus, it is unlikely, in general, that a change due to an MHCS innovation in the military image held by the U.S. population can be detected and verified. This might be possible, however, in the case of a highly visible innovation of wide interest. Studies of the effect on specific subpopulations familiar with the innovation are, in general, much more feasible.

In summary, studying the effect of an MHCS innovation on the organizational image of the MHCS and the military generally is feasible if the innovation is highly visible and important or if the study is limited to specific groups familiar with the innovation. While special-purpose surveys are the most direct approach for the study, measures and indicators of acceptability, retention, and recruitment, may also be useful as indicators if validated.

ORGANIZATIONAL IMAGE

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15. CONTRIBUTIONS TO SOCIETY

CONTRIBUTIONS TO SOCIETY

CONTRIBUTIONS TO SOCIETY

DEFINITION

IMPACTS OF THE MHCS ON SOCIETY AT LARGE

Contributions to society are the impacts of the MHCS on society at large. Included in such impacts are the availability to and effects on the civilian community of products, knowledge, capabilities, and trained manpower due to the MHCS. These may help the civilian health care system to achieve improvements in the effectiveness or economy of its health care delivery. It is recognized, however, that the impacts may be negative as well as positive.

CONTRIBUTIONS TO SOCIETY

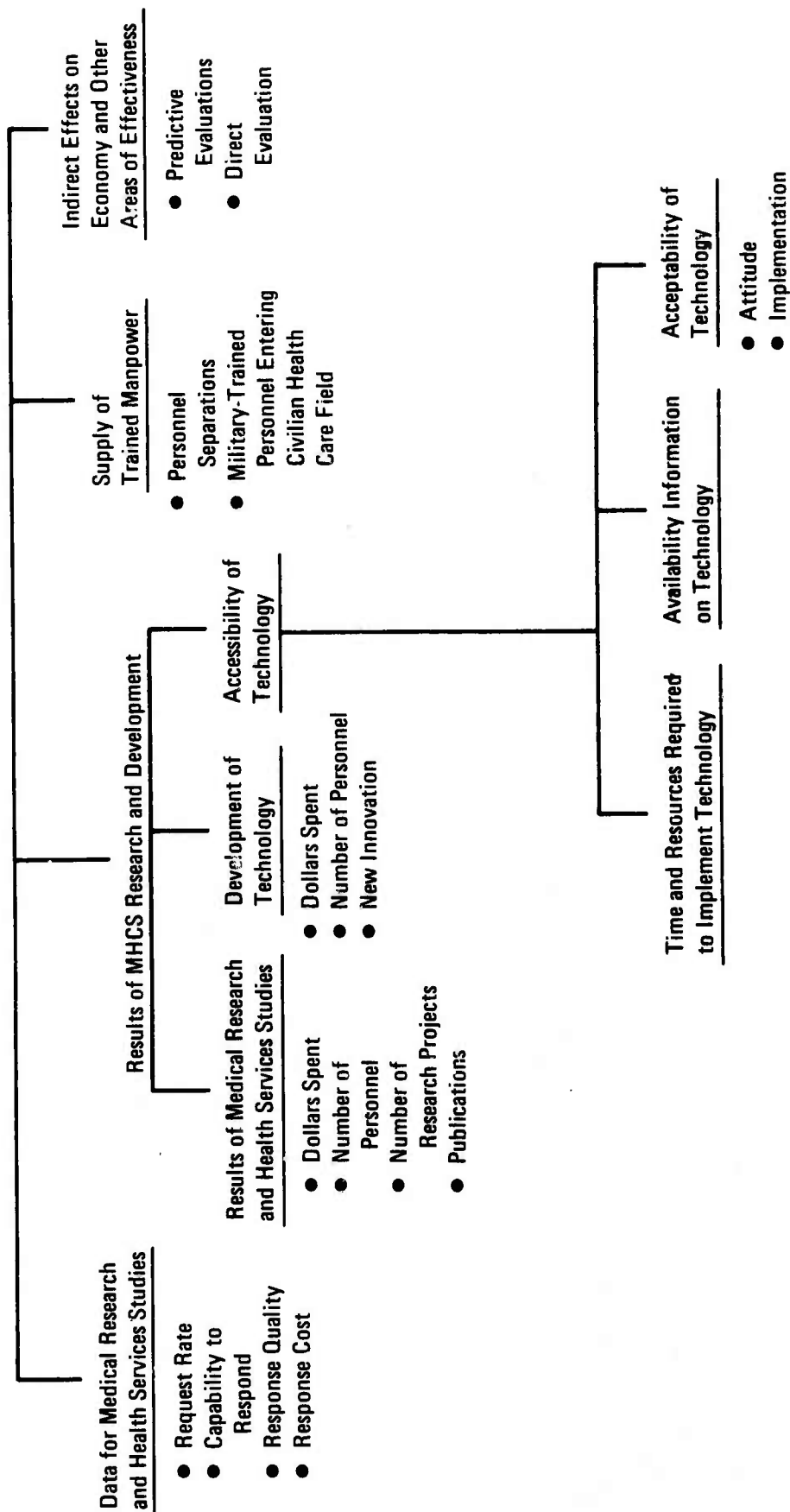
RATIONALE

- MUST RECOGNIZE ALL COSTS AND BENEFITS OF AN INNOVATION
- UNIQUE MHCS CHARACTERISTICS ENABLE CONTRIBUTIONS
 - RECORDS
 - SCOPE OF SYSTEM
 - ACHIEVEMENTS CONTRIBUTED TO THE PUBLIC

The MHCS is not an isolated entity. Most advances and economies, as well as skills acquired by individuals, can affect the civilian sector. A complete evaluation of an MHCS innovation must consider the costs and benefits that occur outside the boundaries of the Department of Defense (DOD).

The MHCS has some unique characteristics that enhance its ability to make positive contributions to research and development. First, the records of the system are potentially a massive data base that could support studies done within the MHCS or by outside organizations. Second, the scope of the MHCS enables it to undertake projects that would be infeasible for a single hospital and for most hospital groups. The MHCS treats more patients, employs more physicians, and operates more facilities over a wider geographical area than any civilian health care provider. Finally, since MHCS achievements are made at public expense they usually become freely available for public use.

**SUBAREAS OF EFFECTIVENESS AND
MAJOR KINDS OF MEASURES AND INDICATORS
FOR CONTRIBUTIONS TO SOCIETY**



This chart shows four subareas into which we have divided the potential contributions of the MHCS to society at large. The first area is provision of data needed for medical research to both military and other users. The next area is products of the system's in-house research and development activities. In addition, the many training programs of the MHCS may affect the third subarea—the national supply of trained health manpower. Depending on the job market, this can be a positive or a negative effect. Finally, effects in the first three subareas may indirectly affect health care outside the DOD in all areas of effectiveness and economy.

Funding for MHCS research and development activities is concentrated in areas of need unique to the military. Nevertheless, these activities can have spin-off applications in civilian health care. Such contributions by the MHCS in the research and development area can be subdivided as shown on this chart. First, the MHCS makes the results of its own medical research and health services studies available to the general public. Second, through its technological research and development efforts it can make health care innovations available to the public. Finally, it can reduce barriers to introduction of new technology in the civilian sector, making the new technology more accessible.

A change in the accessibility of technology might occur in one or more of three areas. The first area includes impacts on the time and resources (dollars and personnel) needed in acquiring technology. The MHCS can also help to make information about new technology available to civilian hospitals. Finally, acceptance of new technology by a large system like the MHCS can influence the acceptability of the technology to the civilian community by demonstrating the benefits it can provide.

For each of the subareas, the chart shows the major kinds of measures and indicators.

CONTRIBUTIONS TO SOCIETY: DATA FOR RESEARCH

MEASURES AND INDICATORS

- AVERAGE ANNUAL NUMBER OF REQUESTS FOR DATA,
BY KIND OF REQUEST
- PERCENT OF REQUESTS FOR WHICH DATA ARE PROVIDED
- PERCENT OF REQUESTS FOR WHICH RESPONSE SATISFIES
REQUESTER'S NEEDS
- PERCENT OF REQUESTS MADE BY INVESTIGATORS WHO
HAVE PREVIOUSLY ASKED FOR DATA
- AVERAGE RESPONSE TIME PER REQUEST 3,6
- AVERAGE COST TO REQUESTER 3,6
- ERROR RATES IN DATA PROVIDED 1,3,6,8,9,10,11,13

BY SOURCE

• MHCS

• OTHER

The measures listed on this chart consider the data retrieval capabilities of the MHCS and, for comparison, the civilian community.

The first measure listed is the average annual number, by kind of requests for information by members of the research community. The term research community is used here in the broadest sense. It includes individuals who are formally or informally involved in medical or health services investigations. It does not completely measure demand since researchers who need data and do not request it are not included.

The percentage of requests for which data are provided is a measure of the responsiveness of the data retrieval system. This measure does not, however, address whether or not the data actually meet the needs of the researcher who made the request. This is considered by the third measure, which is subjective and could be evaluated only by administering a questionnaire to the requesters.

The percentage of requesters who have previously asked for data may be an indicator of the satisfaction of the "customers." This depends on whether a satisfied customer is more likely than an unsatisfied one to request data again.

The final three measures are direct measures of the time, costs, and errors in the process of data retrieval.

CONTRIBUTION TO SOCIETY: DATA FOR RESEARCH

OVERVIEW

- CONSIDER BOTH DEMAND AND RESPONSE
- DEMAND MEASURES
 - READILY APPLIED MEASURE: NUMBER REQUESTS FOR DATA PER YEAR
 - ONLY AUTHORIZED REQUESTS
 - DATA COLLECTION STRAIGHTFORWARD
 - INTERPRETATION LIMITED
- RESPONSE MEASURES
 - SIMPLEST TO USE: PERCENTAGE OF AUTHORIZED REQUESTS FOR WHICH DATA ARE PROVIDED
 - IGNORES ACCEPTABILITY OF DATA
 - MOST USEFUL MEASURE: PERCENTAGE OF AUTHORIZED REQUESTS ACCEPTABLY FILLED
 - ACCEPTABILITY DETERMINED BY
 - APPROPRIATENESS
 - QUALITY
 - COMPLETENESS
 - TIMELINESS
 - REQUIRES SURVEY OF INVESTIGATORS

CONTINUED p. 370

The military health care system creates vast files of information about the health status and health care experiences of its patients. Medical researchers seem to agree that patients' medical records contain a wealth of research data. Their problem is to acquire these data in a useable form. Thus, these MHCS files are a potentially valuable resource to the research community, both within and outside of the DOD. Meaningful measures of the extent to which this potential is realized must account for both the demand for data and the response of the MHCS to that demand.

The most readily applied measure of the demand for these data is the annual number of requests for research data that the MHCS receives. Only requests that are properly authorized should be considered. The recent Privacy Act has placed severe restrictions on the release of personal information, and this could affect authorization of some requests for research data. The effort necessary to collect data on the number of such requests should be small, but the possibility of adequately interpreting the results is limited. A researcher who needs data will only request them if he feels there is a reasonable chance that the request will be filled. Thus, the true demand for data may be greater than indicated by applying this measure.

In evaluating the MHCS response to this demand, the simplest measure to apply would be the percentage of authorized requests for which data were provided. This measure is limited because it does not address the acceptability of the data. A more useful measure, then, is the percentage of authorized requests acceptably filled, as judged by the investigator. Determining the acceptability to researchers of the data provided them would require considerable effort. Acceptability of data to an investigator is determined by such considerations as whether the data are appropriate for his purpose, whether the data are sufficiently accurate and complete, and whether he received them in time to use them. There may be other considerations specific to a particular research effort. Probably the only way to obtain judgments of data acceptability is to survey the investigators who have received data. Such a survey, properly carried out, would entail the same limitations that have been discussed in relation to surveys for other areas of effectiveness.

CONTRIBUTIONS TO SOCIETY: DATA FOR RESEARCH

OVERVIEW (CONT.)

● FOR EVALUATION OF INNOVATION

- COMPLETENESS REQUIRES LENGTHY DATA COLLECTION
 - o DELAYS BEFORE MODIFIED SYSTEM UTILIZED
 - o DATA REQUIRED FOR RESEARCH LONG-TERM
 - o TO OBSERVE TRENDS IN DEMAND AND RESPONSE
- ESTABLISHING CAUSALITY

● OVERALL FEASIBILITY

- EVALUATION FEASIBLE GENERALLY
- ONLY PARTIAL EVALUATION IN SHORT-TERM
- MORE COMPLETE EVALUATION MAY INVOLVE DECADES

An extended period of time would be required to complete an evaluation of the impact of an innovation on these measures. There would probably be a considerable delay in the appearance of the effects of the change. Time would be required to disseminate information and allow researchers to gain experience with the modified system capabilities. Typically, data needed for research are relatively long-term data. This means that, depending on the innovation, there could be a long delay before the innovation would affect a sufficient amount of data to change the ability of the MHCS to contribute data for research. The evaluation would require long-term data collection to allow the observation of trends in demand and response. This could have the additional benefits of allowing, to some extent, observation of effects of the data themselves in the generation of new research questions.

Another consideration introduced in using the measures to evaluate impacts of an innovation is the need to establish the role of the innovation in producing an observed change. The feasibility of accomplishing this depends on the particular innovation to be evaluated. This limitation may not be as great as in other areas of effectiveness. An innovation that affects the way patient records are kept, for example, should have a relatively direct effect on the value of the records for research purposes.

In summary, evaluating the impact of an innovation in this area is generally feasible. However, only limited results are possible in the short term. Even a short-term evaluation could be relatively expensive if a survey instrument were to be properly developed and tested. Measurements over an extended period of time, perhaps decades, would be needed for a complete evaluation. In either case, short or long term, the need to establish the role of the innovation in producing an effect is an important limitation to be considered.

CONTRIBUTIONS TO SOCIETY: RESULTS OF MHCS RESEARCH AND DEVELOPMENT, RESEARCH RESULTS

MEASURES AND INDICATORS

- ANNUAL DOLLARS SPENT
- NUMBER OF RESEARCH PERSONNEL, BY CATEGORY
- NUMBER OF RESEARCH PROJECTS IN PROGRESS
- NUMBER OF RESEARCH PROJECTS COMPLETED/YEAR ⁵
- NUMBER OF ARTICLES PUBLISHED
- NUMBER OF ARTICLES LISTED BY NTIS
- NUMBER OF REQUESTS FOR REPRINTS PER ARTICLE PUBLISHED
- NUMBER OF TIMES CITED IN OTHER WORK

BY SUBJECT

- CLINICAL
- HEALTH SERVICES DELIVERY

This chart lists measures of MHCS research activities.

In general, it is very difficult to measure the quality, effectiveness, or utility of research efforts.

One approach to evaluating research efforts is to assume that quality, effectiveness, and utility of research are strongly correlated with the resources employed in research. The numbers of dollars and personnel by category used in research would then be an indicator of the benefits to society of MHCS research.

The remaining measures are more direct but are more difficult to apply and interpret. The third and fourth items listed are measures of the amount of ongoing and completed research projects. Such counts are limited because of the uncertainty in defining "project" and because all projects, regardless of size or importance, are counted equally.

The fifth and sixth items indicate the number and to some extent the quality of research results. Journals have differing standards for articles. As a result, the fact that an article is published is only a rough indicator of its worth. The number of articles listed by the National Technical Information Service (NTIS) is only an indicator of quantity. No judgment of quality is made by NTIS in accepting articles.

The last two entries may provide a better indicator of the worth of a publication. If greater quality and value of a study means more requests for reprints, the number of such requests is a good indicator. Similarly, the number of citations in other work is a good indicator if higher quality publications are cited more often.

CONTRIBUTIONS TO SOCIETY:

RESULTS OF MHCS RESEARCH AND DEVELOPMENT, DEVELOPMENT OF TECHNOLOGY

MEASURES AND INDICATORS

- ANNUAL DOLLARS SPENT
- NUMBER OF PERSONNEL INVOLVED, BY PERSONNEL CATEGORY
- NUMBER OF TECHNOLOGICAL INNOVATIONS DEVELOPED/
SIGNIFICANTLY CONTRIBUTED TO
 - CLINICAL TECHNIQUES/PROCEDURES
 - HEALTH CARE DELIVERY

This page lists measures and indicators of MHCS contributions to the development of new technology. The first and second may indicate the MHCS contribution in the development of technology by recording the resources which are used. These measures are discussed on the previous chart.

The last measure assesses the number of technological innovations developed or significantly contributed to by the MHCS. There are major limitations in applying the measure. Determining exactly what constitutes an innovation or a significant contribution is difficult, and the measure counts all innovations equally. It provides no indication of the significance of the innovation involved.

CONTRIBUTIONS TO SOCIETY:

RESULTS OF MHCS RESEARCH & DEVELOPMENT, ACCESSIBILITY OF TECHNOLOGY

TIME AND RESOURCES REQUIRED

MEASURES AND INDICATORS

- TIME REQUIRED TO IMPLEMENT TECHNOLOGY

- COST

- TO ACQUIRE AND DEVELOP TECHNOLOGY

- TO UPDATE THE INNOVATION

- NUMBER OF SPECIALIZED PERSONNEL, BROKEN OUT BY HEALTH CARE AND NON-HEALTH CARE PERSONNEL REQUIRED

- TO ACQUIRE AND DEVELOP THE TECHNOLOGY

- TO UPDATE THE INNOVATION

This list includes the measures and indicators needed to evaluate the time, dollars, and specialized personnel required to acquire a technological innovation.

When an innovation developed by the MHCS can be applied in the civilian sector, less civilian effort for development is required. Civilian hospitals can acquire a finished product in less time and at a lower cost, including a smaller investment of personnel.

The MHCS can also reduce the resources, particularly dollars and personnel, required to update an innovation by making alterations and refinements available to the public.

CONTRIBUTIONS TO SOCIETY:

RESULTS OF MHCS RESEARCH AND DEVELOPMENT, ACCESSIBILITY OF TECHNOLOGY

INFORMATION ON TECHNOLOGY

MEASURES AND INDICATORS

- NUMBER OF REQUESTS FOR DOCUMENTS
- NUMBER OF DOCUMENTS AVAILABLE

This chart lists two ways of evaluating the MHCS as a source of information about new technology. Because of its size, the MHCS can justify the expenditure of more time, personnel, and money in documenting and evaluating technology than organizations in the civilian community. Such publications can then be made available through government organizations like NTIS. Further, studies made by the MHCS could be standardized to allow comparability of results.

The number of requests for documents is an indicator of the value to the health care community of the work of the MHCS. The number of documents available indicates the amount of information available.

CONTRIBUTIONS TO SOCIETY:

RESULTS OF MHCS RESEARCH AND DEVELOPMENT, ACCESSIBILITY OF TECHNOLOGY

ACCEPTABILITY

MEASURES AND INDICATORS

- SCORES ON SURVEY OF ATTITUDES TOWARD NEW TECHNOLOGY

GIVEN TO ³

- PHYSICIANS
- ADMINISTRATORS
- OTHER

- RATE OF IMPLEMENTATION OF NEW TECHNOLOGY OUTSIDE MHCS

- TOTAL NUMBER OF INSTITUTIONS OUTSIDE MHCS USING NEW TECHNOLOGY

- PERCENT OF CARE PROVIDERS WHO USE A SPECIFIED INNOVATION PROVIDED FOR THEIR USE

The final subarea of accessibility of technology is acceptability. The MHCS can take a leadership role in adopting new technology and demonstrating changes in the effectiveness and economy that can be attained through its adoption. That leadership can affect acceptance of the technology outside the MHCS. The four measures or indicators on this chart are intended to assess this acceptance. The first employs surveys of health care personnel in various categories to determine their attitudes towards new technology, and the last is a quantitative indicator of their acceptance. The two remaining indicators show the extent to which the new technology is spreading into the health care community.

CONTRIBUTIONS TO SOCIETY: RESULTS OF MHCS RESEARCH AND DEVELOPMENT

OVERVIEW

- TWO GROUPS OF MEASURES AND INDICATORS
 - APPLIED WITHIN MHCS
 - APPLIED OUTSIDE MHCS
- MEASURES AND INDICATORS APPLIED WITHIN THE MHCS
 - GENERALLY STRAIGHTFORWARD
 - SOME TERMS REQUIRE DEFINITION
- FOR MEASURES AND INDICATORS OUTSIDE MHCS
 - LIMITATIONS TO DATA COLLECTION IN CIVILIAN COMMUNITY
 - ○ DATA AVAILABILITY
 - DATA COMPARABILITY
 - DEFINITION
 - FORMAT
 - ACCURACY
 - ACCEPTABILITY SURVEYS

CONTINUED p. 384

Measures and indicators of the contribution of the MHCS to research and to the development and accessibility of technology include some that would be applied within the MHCS and others that would be applied outside the MHCS. Within the MHCS, the level of research and development activities, as well as their results, would be measured. Outside the MHCS, the extent to which MHCS results are used and factors such as cost that affect their use would be measured.

The measures and indicators of MHCS research and development activities and results are, for the most part, straightforward and should be easy and inexpensive to apply. The primary limitation associated with them is that terms used in some of them lack definitions that are useable and acceptable to the health care community. For example, we must know specifically what constitutes a "significant contribution" to the development of a health care delivery innovation before the measure—number of health care delivery innovations developed or significantly contributed to—can be applied.

Measures and indicators to be applied outside the MHCS entail major limitations associated with collecting data in the civilian community. The required data may not exist, or may be regarded as confidential and not released to outsiders. Also, data collected at different facilities are not likely to be comparable. Collection criteria, formats, and accuracy may vary. For measures of the acceptability of new technology, surveys of staff and management in civilian hospitals would be needed. Such surveys involve the difficulties that are discussed in relation to surveys in other areas of effectiveness.

CONTRIBUTIONS TO SOCIETY: RESULTS OF MHCS
RESEARCH AND DEVELOPMENT

OVERVIEW (CONT.)

- CHANGES IN TECHNOLOGY BEFORE ADOPTION
 - IDENTIFICATION
 - JUDGMENT OF MILITARY IMPACT
 - CHANGES NOT UNIFORM
- DIFFICULT TO ESTABLISH CONTRIBUTION OF
RESEARCH RESULTS

CONTINUED p. 386

Another limitation is that an innovation developed in the MHCS may be changed before being adopted in the civilian health care system. In this case, an additional task is introduced—identifying the nature and extent of the military innovation's influence on the innovation introduced in the civilian health care system. Alterations may vary from institution to institution, so such a judgment would have to be made on a case-by-case basis. The limitation is even greater when the MHCS's contribution is less tangible as in the case of medical research or health services studies. Methodologies and results of such studies may often be used later in further studies. Progress in research usually comes from combining several results. It might be quite difficult to establish that a particular MHCS study had contributed to some research advance.

CONTRIBUTIONS TO SOCIETY: RESULTS OF MHCS RESEARCH AND DEVELOPMENT

OVERVIEW (CONT.)

- MEASURES AND INDICATORS IDENTIFIED FAIL TO REFLECT RELATIVE
VALUE OF ADVANCES
 - LIMITATION APPLIES GENERALLY
 - ONLY MILESTONE ADVANCES DISCUSSED IN THE LITERATURE
- EVALUATING IMPACT OF MHCS INNOVATION
 - CONTROLLED AND BEFORE-AFTER STUDIES NOT APPLICABLE
 - ESTIMATION NECESSARY
 - ASSUMPTIONS AND RESULTS HOSPITAL-SPECIFIC
 - EXTRAPOLATION DIFFICULT
 - EXAMPLE: RESOURCE SAVING IN INTRODUCING AN INNOVATION

CONTINUED P. 388

In general the measures and indicators identified in this area count advances and applications or concern the ease with which a particular improvement can be implemented in the civilian health care sector. They share a common limitation: they fail to reflect the relative value or importance of the advances, treating them all as equal. Discussions in the literature provide some assistance by identifying the milestone advances in medicine that have been made by the military. This, unfortunately, is far too limited to be of significant use. Most advances, even those of considerable importance, could not be classified as milestones.

For evaluating the impact of a particular MHCS innovation on most aspects of this subarea of effectiveness, neither a controlled trial nor a before-after evaluation will generally be applicable. Once a research advance is made or a technological innovation developed, we can only estimate the costs that would have been incurred, the other advances that would have been made, etc. had it not been accomplished. These estimates could be obtained from experts or could be derived from previous experiences. Numerous assumptions would be required to arrive at such estimates and they would, of necessity, be very hospital-specific, making extrapolation difficult.

CONTRIBUTIONS TO SOCIETY: RESULTS OF MHCS RESEARCH AND DEVELOPMENT

OVERVIEW (CONT.)

- OVERALL FEASIBILITY
 - MOST MEASURES FEASIBLE TO APPLY
 - MHCS RESOURCES
 - COUNTS OF HOSPITALS ADOPTING MAJOR INNOVATIONS
 - ACCEPTABILITY SURVEYS
 - ONLY ROUGH INDICATORS OF CONTRIBUTION
 - IMPACT ON RESOURCES REQUIRED TO OBTAIN TECHNOLOGY
 - ONLY COARSE ESTIMATION POSSIBLE

In summary, it is feasible to measure the resources used by the MHCS for medical research and development. It is also feasible to count the number of civilian hospitals adopting major innovations developed or contributed to by the MHCS. These are indicators, though only rough ones, of the extent of the military contribution. Surveys to measure the acceptability of technology are feasible, though somewhat costly. Evaluating an impact on the resources required by a civilian institution to implement an innovation is somewhat less promising, but some study is feasible. Estimates of differences between the resources required to obtain an innovation that has been developed, and the resources required to develop and then implement it could be made, but they would necessarily be coarse ones.

CONTRIBUTIONS TO SOCIETY: SUPPLY OF TRAINED MANPOWER

MEASURES AND INDICATORS

- AVERAGE NUMBER OF PERSONNEL WHO LEAVE MHCS PER YEAR
- AVERAGE NUMBER OF PERSONS ENTERING THE CIVILIAN HEALTH CARE LABOR MARKET PER YEAR WHO RECEIVED ALL OR PART OF TRAINING IN MHCS
- PERCENT OF TOTAL PERSONS ENTERING CIVILIAN HEALTH CARE LABOR MARKET PER YEAR WHO RECEIVED ALL OR PART OF TRAINING IN MHCS
- NUMBER OF CURRENTLY EMPLOYED CIVILIAN HEALTH CARE PERSONNEL WHO RECEIVED TRAINING IN MHCS
- PERCENT OF CURRENTLY EMPLOYED CIVILIAN HEALTH CARE PERSONNEL WHO RECEIVED TRAINING IN MHCS

BY

- PHYSICIANS
(by specialty)
- NURSES
(by specialty)
- TECHNICIANS
(by specialty)
- OTHER

The measures and indicators on this chart deal with the MHCS's effect on manpower supply of the non-military health care system.

The first item measures the potential yearly MHCS contribution to civilian manpower requirements. Its advantage is that it is an objective measure for which data could be collected from military personnel files. However, it measures only the potential contribution since not all persons leaving the MHCS join the civilian health care system.

The second and third items measure the yearly contribution of the MHCS to trained civilian health manpower. The second one is the number of persons trained in the MHCS who enter the civilian health care labor market annually. The third one assesses the weight of this contribution by comparing this number to the total number of persons who enter that labor market during the year.

The last two measures are similar to the two that precede them, but they measure the total MHCS contribution to current civilian health care manpower.

CONTRIBUTIONS TO SOCIETY: SUPPLY OF TRAINED MANPOWER

OVERVIEW

- MILITARY SUPPLEMENTS SUPPLY OF HEALTH CARE MANPOWER
- SIMPLEST INDICATOR - ANNUAL NUMBER OF HEALTH CARE PERSONNEL SEPARATED FROM MILITARY
 - NOT MEASURE OF CUMULATIVE CONTRIBUTION
 - VOLUNTARY DECISIONS TO LEAVE FIELD
 - RETIREMENT
 - NEW CAREER CHOICE
 - NOT ALL MHCS SPECIALTIES COMPARABLE TO CIVILIAN ONES

CONTINUED p. 394

Personnel separating from military service who have been trained in health care specialties increase the supply of health manpower available to the civilian community. An indication of this impact could be obtained without great difficulty by auditing military discharge records to determine the numbers of such personnel, by category, who are discharged in a given time period. This indicator, however, does not address the cumulative manpower contribution of the military, nor does it reflect the fact that some separating personnel will choose to retire or to enter fields other than health care. Further, since some military health care system specialties do not have direct civilian counterparts, some MHCS personnel would require retraining for civilian jobs. Assessing the impact of their military background would thus be more complicated.

CONTRIBUTION TO SOCIETY: SUPPLY OF TRAINED MANPOWER

OVERVIEW (CONT.)

- MORE COMPREHENSIVE MEASURES IDENTIFY VETERANS IN CIVILIAN COMMUNITY
 - SAMPLING PRIMARY ALTERNATIVE
 - MONITOR A SAMPLE OF SEPARATING MHCS-TRAINED VETERANS
 - DONE BY EXISTING MEDIHC PROGRAM
 - STUDY A SAMPLE OF CIVILIAN HEALTH CARE PERSONNEL
 - CONSIDER REGIONAL VARIATION IN NUMBERS OF VETERANS
 - CONSIDER REGIONAL VARIATION IN CIVILIAN DEMAND
- ESTABLISHING CAUSALITY IS A LIMITATION AS IN OTHER EFFECTIVENESS AREAS
 - IMPACT STRONGLY AFFECTED BY NATIONAL EVENTS/POLICIES
- OVERALL FEASIBILITY
 - SIMPLEST MEASURE IS INDICATOR OF MILITARY CONTRIBUTION
 - SOME DATA EXIST FOR STUDIES OUTSIDE MILITARY
 - CAUSALITY IS PRIMARY LIMITATION

Many of the limitations of considering only military discharge data could be overcome by studying civilian health manpower. Data from the civilian sector could be used to determine the fraction of personnel who received health training in the military as well as how many separating MHCS personnel actually enter the civilian health sector. Sampling is the primary alternative for these studies. One possibility is to monitor a selected number of separating military health care personnel to determine the fraction placed in health-related jobs. This has been done in the Military Experience Directed Into Health Care (MEDIHC) Program, basically a job placement program for veterans with health care training. That program is a potential data source for evaluating MHCS impacts in this area. A second alternative would be to sample employees in civilian health care occupations to determine the fraction of them who have military training. Regional variations in the proportion of veterans in the population and in the civilian health care demand should be considered in selecting the sample. We have not identified an existing data source for this second study approach. The need to establish a causal relationship between an MHCS innovation and an observed change is a limitation to evaluation. The MHCS contribution to health manpower is very sensitive to national events and changes in national policy (e.g., the draft), so the limitation is very significant for this area.

In summary, investigation of a contribution of the MHCS to civilian health care manpower is feasible. Data are available in the MHCS on numbers of separating personnel and through the MEDIHC Program on the proportion of those personnel placed in civilian health care jobs or involved in civilian training programs. The primary limitation to evaluating the impact on civilian manpower of an innovation in the MHCS is the task of establishing the role of the innovation in producing an observed change.

CONTRIBUTIONS TO SOCIETY:

INDIRECT EFFECTS ON EFFECTIVENESS AND ECONOMY

MEASURES AND INDICATORS

FOR DIRECT EVALUATION

- SEE OTHER MEASURES AND INDICATORS OF EFFECTIVENESS AND ECONOMY LISTED IN THIS PAPER

FOR PREDICTIVE EVALUATION

- PERCENT OF CHANGES IN MHCS EFFECTIVENESS DUE TO AN MHCS INNOVATION THAT ARE TRANSFERABLE TO THE NON-MILITARY HEALTH CARE SYSTEM
- PERCENT OF MHCS COST CHANGES DUE TO AN MHCS INNOVATION THAT ARE TRANSFERABLE TO THE NON-MILITARY HEALTH CARE SYSTEM

Costs and benefits to the civilian health care system, as a result of adopting an MHCS innovation, are indirectly attributable to the MHCS.

There are two approaches to measuring such effects. The first would be to apply in the civilian community the measures and indicators discussed in this paper. In addition to the difficulties of data collection in non-military hospitals, it would be difficult to attribute observed changes to a given MHCS innovation because of the likelihood of intervening factors.

A second approach is to use measured changes in cost and effectiveness in the MHCS due to an innovation to predict changes that may occur in the civilian health care system when that innovation is introduced there. Experts would consider the similarities and differences in the two systems and estimates would be obtained about how the innovation would affect civilian health care.

CONTRIBUTIONS TO SOCIETY: INDIRECT EFFECTS ON EFFECTIVENESS AND ECONOMY

OVERVIEW

- DIRECT EVALUATIONS
 - USE MEASURES AND INDICATORS IDENTIFIED FOR OTHER AREAS OF EFFECTIVENESS
 - MAJOR UNDERTAKING, MANY LIMITATIONS
 - ESTABLISHING CAUSALITY PARTICULARLY DIFFICULT FOR INDIRECT RESULTS
- PREDICTIVE EVALUATIONS
 - USE MHCS RESULTS
 - REQUIRES INDIVIDUALS WITH DETAILED KNOWLEDGE OF CIVILIAN HOSPITALS AND MHCS
 - RESULTS COARSE
 - COST DEPENDS ON EXPERTISE EMPLOYED, BUT LESS THAN DIRECT EVALUATION
- OVERALL FEASIBILITY
 - SOME EVALUATION FEASIBLE FOR EACH APPROACH
 - DEPENDS ON SITUATION
 - MUST WEIGH COST AND POTENTIAL RESULTS OF EVALUATION APPROACHES

The indirect effects of the MHCS on the economy and effectiveness of civilian health care could be evaluated using two different approaches: direct evaluation and predictive evaluation.

The measures and indicators identified in other sections of this paper are generally applicable for use in direct evaluations of civilian hospitals. As the preceding discussions of those measures and indicators point out, such an evaluation would be a major undertaking subject to many limitations that cast doubt on the value of the results. The difficulty of establishing a causal relationship between an innovation and observed changes has been stressed throughout. This limitation is of even greater significance in this case since the effects to be evaluated are indirect ones.

Another method of evaluating these indirect effects is to use results of evaluating effects within the MHCS as a basis for predicting indirect effects in civilian institutions. A major limitation to this approach is the need to identify persons with sufficient knowledge of both civilian and military hospitals to develop the predictions. This approach could produce only coarse results subject to considerable uncertainty. However, it would be considerably less costly and much more feasible than a direct evaluation, even considering the possibly large cost of employing persons with the requisite expertise to make the predictions. A thorough evaluation using the direct evaluation approach is not feasible, but some direct evaluation could be accomplished. It would have to focus on specific effects and would be subject to all the limitations associated with the measures selected. A predictive evaluation would generally be feasible if effects of an innovation within the MHCS have been evaluated and if sufficient resources to employ the necessary expertise were available.

Selection of an approach depends on the resources that can be invested and the degree of specificity and refinement of results required.

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16. ECONOMY

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ECONOMY

ECONOMY

DEFINITION

THE EXTENT OF THE LIFETIME BENEFITS RECEIVED
FOR THE RESOURCES INVESTED, WHERE BENEFITS INCLUDE:

- DOLLAR AND NON-DOLLAR
- QUANTITATIVE AND QUALITATIVE

AND RESOURCES INCLUDE, IN ADDITION TO DOLLARS, SCARCE:

- MANPOWER
- PHYSICAL FACILITIES
- TECHNICAL RESOURCES

Economy is the extent of lifetime benefits received for resources invested. Benefits may be expressed in dollars but need not be necessarily, and they may be quantitative or qualitative. Resources invested are primarily measured in dollars but include in addition amounts of manpower, physical resources, and technical resources when they are scarce or otherwise constrained.

"Lifetime benefits" in the definition include all benefits accruing during the entire useful life of the building, system, or other entity whose economy is being evaluated. Further, benefits in this definition are net benefits with costs or other negative effects taken into account along with the positive ones. When defined in this manner, economy is a direct measure of the productivity of the system.

Evaluation of an innovation's impact on economy entails assessment, as appropriate, of impacts in all areas of effectiveness previously discussed. These must be judged in relation to the net investment of resources required to introduce and retain in innovation.

ECONOMY

RATIONALE

- WHEN RESOURCES ARE LIMITED ECONOMY DETERMINES
ATTAINABLE BENEFITS
- MAJOR NATIONAL EMPHASIS
- MAJOR MHCS OBJECTIVE

Whenever resources are limited in relation to need and demand, the economy with which resources are consumed establishes the limit on the amount of benefits that can be realized.

With the rapid rise in costs and the limit on both dollars and some categories of provider personnel, emphasis on economy in health care delivery has become a major national emphasis strongly supported by federal legislation.

The economical delivery of high-quality care is an explicitly stated objective of the MHCS.

ECONOMY

MEASURES AND INDICATORS

- UNITS OF EFFECTIVENESS (OR BENEFIT) PER UNIT OF
RESOURCES EXPENDED*

- DOLLAR BENEFITS LESS DOLLAR COSTS**

* 1,2,5,6,7,8,10,11,12,17,18,19,20,21,23,27,28,32,34,35,36,37,38,39

** 2,3,4,6,8,9,10,11,13,15,16,18,19,22,23,24,25,26,29,30,31,32,33,
35,37,38,39

The two measures of economy on this chart are very generally stated. The first, units of effectiveness per unit of resources expended, represents many specific measures. The measures appropriate for evaluating a particular project depend on their individual nature, scope, and objectives. For example, a very limited effectiveness measure commonly used to evaluate health screening projects is the number of significant abnormalities detected. A corresponding economy measure is the number of significant abnormalities detected per dollar expended in screening and care. An alternative economy measure in terms of a particularly scarce resource is the number of significant abnormalities detected per physician man-hour expended. A measure more significant than any of these (although much more difficult to apply) is years of life healthier than a specified level per dollar expended or per physician man-hour expended. In each case, units of effectiveness achieved are related to scarce resources expended. To evaluate the economy of a program for increasing the total number of medical treatment facilities (thereby increasing the availability of health care) one might use as a measure the dollar cost per bed increase in total bed capacity.

The net benefit and cost measure of economy is generally expressed in dollars; however, other units of measure are possible if both benefits and costs can be quantified in the same nondollar units. As in the case of the cost-effectiveness ratio, the net benefit or net cost measure that is appropriate depends on the nature, scope, and objectives of the project to be evaluated.

ECONOMY

OVERVIEW

- EFFECTIVENESS COMBINED WITH COSTS
- METHODS OF COST MEASUREMENT
 - CONCEPTUALLY STRAIGHTFORWARD
 - LIMITATIONS IN APPLYING
 - EVALUATING COST CHANGES
 - IDENTIFICATION
 - PREDICTION
 - MEASUREMENT
 - RELATING Δ Costs to Δ Benefits
 - USUALLY MUST USE AGGREGATE COSTS

CONTINUED P. 412

An evaluation of economy combines measures of effectiveness (or benefits) with measures of cost. The preceding sections of this report consider measures of benefit and effectiveness in major areas related to the overall objectives of the MHCS. Thus, this discussion of economy addresses cost measurement and approaches for comparing costs and effects to evaluate economy.

In general, there is little conceptual difficulty with methods of cost measurement. Practical limitations, however, invariably arise when methods are applied to specific situations. If, for example, the impact of a technological innovation is to be evaluated, it will be necessary to identify all associated changes in cost. To do this, one must first decide what elements of cost are a part of the system into which the innovation is introduced. In a predictive evaluation, one must estimate costs prior to incurring them. The estimates may not be indicative of actual costs due to uncontrollable events (differential inflation, changes in system specifications, etc.) subsequent to the estimation process or due to failure to identify all relevant costs. A concurrent evaluation may be complicated by the fact that costs may also be affected by changes, often unanticipated, other than those associated with the innovation being evaluated. The costs due to these changes must also be accounted for.

Ideally, one would like to be able to relate specific cost changes to specific changes in benefits and effectiveness. This would facilitate resource allocation to achieve specific benefits. Unfortunately, the cause and effect relationship between incurring specific costs and realizing specific benefits can seldom be established. One is normally resigned to relating an aggregate cost figure to benefits achieved.

ECONOMY

OVERVIEW (CONT.)

- SINGLE EFFECTIVENESS MEASURE HELPFUL
 - MOST COMMON APPROACH: DOLLAR BENEFITS
 - SUBJECTIVE JUDGMENT
 - CONTROVERSIAL
 - OTHER APPROACHES LIMITED

CONTINUED P. 414

In view of this, it would be particularly helpful to have a single measure of benefit sufficiently comprehensive to include all significant expected impacts of a given innovation. If a single measure could be identified then only one measure of economy would have to be considered by the decisionmaker.

Probably, the most common methods of obtaining a single benefit measure is to express all benefits in dollars. This is desirable because it facilitates comparison of benefits and costs. However, many kinds of benefits can be expressed in dollars only by means of highly subjective judgments of values. Dollar values so derived tend to be highly controversial. Unfortunately, unless dollars can be used, it is rarely possible to identify a single appropriate benefit measure. This is especially true in assessing benefits of innovations that significantly impact more than one of the overall health care system areas of effectiveness. In such situations, a decisionmaker must consider the entire collection of benefits, subjectively assessing their relative values. They are well established techniques for eliciting subjective judgments systematically. They are still controversial, however, because of their subjective derivation.

ECONOMY

OVERVIEW (CONT.)

- SPECIAL CONSIDERATIONS FOR PREDICTION, EXTRAPOLATION
 - LIFE CYCLE
 - DISCOUNT RATE
 - INFLATION
 - BENEFIT AND COST OVERTIME
- ALTERNATIVES

CONTINUED p. 416

There are several special considerations in predicting or extrapolating the economy of an innovation. One of these is specification of the length of the system's life cycle or the expected period over which benefits will accrue. This is the period of years over which benefits and costs must be compared. Although the Department of Defense has established maximum economic lives for various categories of investment, the exact period that should be considered for a specific investment is debatable.

A second consideration is the use of discounting to relate all future dollar benefits and costs of a project to the present. In order to reduce future dollars to a present value, an appropriate discount rate must be selected. Assuming that several investment opportunities exist, the appropriate discount rate depends on the opportunities available for exchanging present dollars for future ones. Although the Department of Defense has determined that a 10-percent discount rate is appropriate for defense studies, this percentage is somewhat arbitrary and, hence, controversial. The choice can be of major importance since the life cycle economy of a project is typically quite sensitive to the rate selected.

Inflation is a third important consideration in evaluating economy. The cost of health care services can inflate over time due to forces in the economy generally. Also, technological advances resulting in new modes of health care delivery may have an inflationary effect on health care costs. To be complete, studies of economy should include likely inflationary trends. This is extremely difficult to do with adequate confidence.

The confidence with which benefits and costs can be predicted over time is a third consideration. Both the magnitude of benefits and costs and the time delay between incurring costs and achieving benefits will significantly affect the economic prediction. The inherent errors in estimating these values will necessarily result in uncertainty in the determination of economy.

Comparison of all feasible alternatives is necessary to ensure that the most economical choice is identified when considering an innovation. Rarely, however, are all alternatives evaluated with formal economic analysis techniques. A priori judgments are normally used to reject some alternatives. While this increases the risk of suboptimal selection, the time and costs required to formally evaluate each alternative are usually prohibitive.

ECONOMY

OVERVIEW (CONT.)

- OVERALL FEASIBILITY
 - COSTLY
 - PARTIAL RESULTS
 - DEPENDS ON MEASURING BENEFITS, COST CHANGES
 - SENSITIVITY ANALYSIS NECESSARY
 - PRECISION UNCERTAIN
 - ASSUMPTIONS NECESSARY
 - ILLUMINATES DECISIONS

In considering the overall feasibility of measuring economy, it can be said that the task is frequently sizeable and costly and can usually be accomplished only partially. Since measuring economy depends on measuring effectiveness or benefits, all of the limitations discussed in relation to evaluating measures of effectiveness are also limitations in studying economy. In addition, there are significant limitations to assessing the entire range of cost changes associated with an innovation. Because measurement precision is uncertain and because assumptions must often be made about uncertain aspects of the environment, about relationships among variables, and about measurements that cannot be obtained, an analysis of the sensitivity of the results to the assumptions made is an essential part of any study of economy. Such an analysis can identify the areas that need further study and refinement.

Finally, it should be emphasized that the results of an economic analysis can illuminate the consequences of alternative decisions. It thus assists the decisionmaker in arriving at his decision. An economic analysis can never, however, specify what the decision must be.

ECONOMY

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides an overview of measures and indicators that might be used to evaluate the impact of health care system innovations on the system's effectiveness in accomplishing its fundamental objectives. This report identifies 11 areas of effec- tiveness: quality; availability; accessibility; acceptability; appropriateness of utilization; retention, recruitment, and training; absenteeism; personnel performance; response to changing		

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Abstract (Cont.)

needs; organizational image; and contributions to society. Measures and indicators for each of these areas as well as for economy are presented, and the feasibility of collecting data and using them for evaluation is discussed. From these measures and indicators an evaluator could select those most useful for his purpose. The immediate intended use of the report is to identify measures and indicators for evaluating the impact of the TRIMIS Program on the military health care system. Nevertheless, many, if not most, of the measures and indicators identified are equally applicable to any health care system.

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SUBJECT: Technical Report, "Measures and Indicators for Evaluation of Innovations to the Health Care System" by Analytic Services Inc.

Subject report has been reviewed and is cleared for publication provided that it is accompanied by a conspicuous disclaimer stating that the views, opinions, and/or findings contained in this paper are those of the author, and should not be construed as an official Department of Defense or other Government office or agency position.

Review by the Office of the Assistant Secretary of Defense (Health Affairs) indicates that the report lacks specificity in the measures to be utilized for evaluation purposes, therefore the disclaimer is considered appropriate.

A handwritten signature in dark ink, appearing to read "Walter J. E. Bodling", is written over the typed name.

Walter J. E. Bodling
Chief, OSD Division
Directorate for Freedom of Information
and Security Review

Attachment

HEALTH SYSTEMS DIVISION NOTE
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MEASURES AND INDICATORS FOR EVALUATION OF INNOVATIONS
TO
THE HEALTH CARE SYSTEM

June 1977

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